TOBACCO BASICS HANDBOOK

2004 EDITION

AADAC
Alberta Alcohol and Drug Abuse Commission
An Agency of the Government of Alberta

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2004 EDITION

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INTRODUCTION

The Tobacco Basics Handbook

The AADAC 2004 Tobacco Basics Handbook is designed to provide a comprehensive evidence-based source of information to assist a variety of readers. This handbook extensively documents research results and findings from many studies and sources, combining these into a single source of basic facts and current knowledge in the tobacco control field.

More Than a Reference

The AADAC 2004 Tobacco Basics Handbook is intended primarily for people working within tobacco reduction, but its content is accessible to anyone interested in this important area of population health. The Tobacco Basics Handbook provides clear, readable information in sections that can be used independently. Because the chapters are designed to be used independently, you will see information repeated in some sections.

In the handbook, you'll find information that is

- **Alberta-specific**
  Where possible, this handbook uses Alberta data and puts the issues in a context relevant to people in this province. In addition, Canadian and world statistics are provided.
- **evidence-based and fully referenced**
  Most information in the handbook is based on articles from peer-reviewed journals. Every effort has been made to check the accuracy of the information and to ensure that a substantial body of evidence supports the information reported.
- **up to date**
  Research in this field changes every day. This handbook is based on current, published research, and will be revised from time to time as necessary.

How to Use This Handbook

Because people need varying levels of information, this handbook is designed to accommodate several types of readers:

- Readers can gather key information by referring to the "Quick Facts" at the start of each section and by reading the bold text on each page.

- Readers who would like more information can read the supporting information that appears below the bold text.
- Further details and related information can be found in the margins, and in the full-page explanations that appear in some of the sections.

Choose the level of detail you require.

SMOKING PREVALENCE

Quick Facts

Alberta

- 23% of Albertans aged 15+ are current smokers (18% are current daily smokers and 5% are current occasional smokers).[1]
- 24% of Alberta females and 22% of Alberta males are current smokers.[1]
- 13% of Alberta teens, between the ages of 15 and 19 years, are current smokers; 22% are females and 16% are males.[1]
- The highest proportion of "never smokers" in Alberta are amongst teens age 15 to 19 years (76%).[1]
- The highest proportion of current smokers in Alberta is found among young adults age 20 to 24 years (30% are current smokers).
- The highest proportions of current daily smokers are found in the 20-to-24 (21%), 25-to-34 (21%), and 35-to-44 (20%) age groups.[1]
- The highest proportion of current occasional smokers (9%) is found among young adults age 20 to 24 years.[1]
- Daily smokers in Alberta smoke an average of 16 cigarettes per day.[1]

- Among current smokers in Alberta, those with lower levels of education are more likely to be daily smokers than those with higher education.[1]
- 1.4% of Albertans use spit tobacco.[2]

Canada

- 21% of Canadians aged 15+ are current smokers (18% are daily smokers and 4% smoke occasionally).[1]
- 23% of Canadian males are current smokers, compared to 20% of Canadian women.[1]
- Current smoking rates among teens aged 15 to 19 have been rising since 1990 and are now at 22% (23% of teen females compared to 21% of teen males).[1]
- Current smoking rates in Canada are highest among 20- to 24-year-olds (31%). Males (31%) in this age group have similar smoking rates to that of females (30%).[1]
- Smoking among Aboriginal Canadians is much higher than the national average (62%).[3]
- 3% of Canadians use cigars/cigarillos.[2]
- 1% of Canadians use spit tobacco.

Definitions

A **current smoker** is a person who currently smokes cigarettes daily or occasionally.

A **daily smoker** is a person who currently smokes cigarettes every day.

A **non-daily (occasional) smoker** is a person who currently smokes cigarettes, but not every day.

A **never smoker** is a person who was an experimental smoker or who is a lifetime abstainer.

An **experimental smoker** is a person who has smoked at least one cigarette, but less than 100 cigarettes, and currently does not smoke cigarettes.

A **lifetime abstainer** is a person who has never smoked cigarettes at all.

Smoking prevalence is that proportion of a population that smokes cigarettes at the current time.

(Note: Definitions are taken from the Canadian Tobacco Use Monitoring Survey.)

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SMOKING PREVALENCE

Today, one in three adults, or about 1.1 billion people, smoke worldwide; of these, about 80% live in low and middle income countries.[1]

Analysts estimate that worldwide 82,000 to 99,000 young people start smoking each day. Of these, between 68,000 and 84,000 are from lower income countries.

Populations are growing in developing nations, and per capita income is on the rise. These factors, together with the increase in smoking prevalence, have led analysts to predict that within 40 years, 70% of tobacco-related deaths will occur in developing nations.[2]

Smoking Rates in Alberta and Canada

Alberta Smoking Rates

Smoking prevalence in Alberta has declined by about 10% between 1991 and 2001.

Between 1985 and 1991 there was no significant change in current smoking prevalence rates for Albertans aged 15 years and older. However, prevalence rates decreased by about 5% between 1991 and 1994/95 and then by another 5% between 1994/95 and 2001. Thus, Alberta began to see a change in smoking prevalence from the early 1990s.[3]

Alberta's smoking prevalence rate (23%) is higher than the Canadian rate (21%).[4]

According to data from the 2002 Canadian Tobacco Use Monitoring Survey (CTUMS),[5]

- 23% of Albertans aged 15+ are current smokers (18% are current daily smokers and 5% are current occasional smokers).
- Of the 23% of Albertans who are current smokers, 24% are women and 22% are men.
- 19% of Alberta teens, between the ages of 15 and 19 years, are current smokers; 22% are females and 16% are males.
- The highest proportion of never smokers in Alberta are amongst teens age 15 to 19 years (76%).
- The highest proportion of current smokers in Alberta is found among young adults age 20 to 24 years (30% are current smokers).
- The highest proportions of current daily smokers are found in the 20-to-24 (21%), 25-to-34 (21%), and 35-to-44 (20%) age groups.

- The highest proportion of current occasional smokers (9%) is found among young adults age 20 to 24 years.
- Daily smokers in Alberta smoke an average of 16 cigarettes per day.
- Among current smokers in Alberta, those with lower levels of education are more likely than those with higher education to be daily smokers.

Smoking status and level of education

Data from the 2002 CTUMS show a definite trend amongst current and never smokers in relation to their educational level. That is, the higher the level of education, the less likely a person is to be a current smoker. Albertans with the highest levels of education are most likely to have never smoked.[4]

However, former smokers are just as likely to have not completed high school as to have completed a post-secondary education.[4]

DEFINITIONS

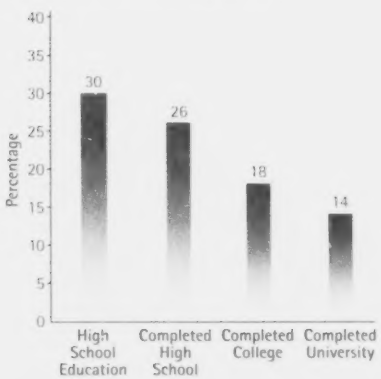
A **current smoker** is a person who currently smokes cigarettes daily or occasionally.

A **daily smoker** is a person who currently smokes cigarettes every day.

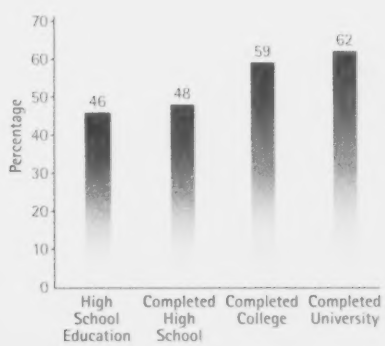
A **non-daily (occasional) smoker** is a person who currently smokes cigarettes, but not every day.

Smoking prevalence is the proportion of a population that smokes cigarettes at the current time.

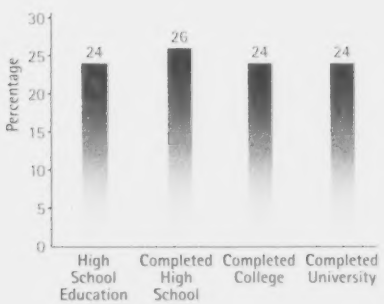
Percentage of Current Smokers in Alberta by Highest Level of Education Attained, 2002



Percentage of Never Smokers in Alberta by Highest Level of Education Attained, 2002



Percentage of Former Smokers in Alberta by Highest Level of Education Attained, 2002



Source: Statistics Canada. Canadian Tobacco Use Monitoring Survey, 2002

Smoking status and the workplace

A 2002 AADAC study, Substance Use and Gambling in the Alberta Workplace, 2002: A Replication Study, provided current information on substance use, such as tobacco use, in the Alberta workplace. Study results revealed that in 2002[5]

- 30% of workers in the paid labour force had used tobacco (that is cigarettes, cigars, and/or spit tobacco) at some time in the month prior to the survey.
- Cigarettes were the most commonly used type of tobacco product.
- One quarter of Alberta workers (27%) were daily smokers.

- One in 10 workers (13%) reported moderate (11 to 19 cigarettes/day) or heavy (20+ cigarettes/day) smoking.
- Less than one quarter (22%) of workers, for an estimated total of 368,236 people, used tobacco while at work.

Canadian Smoking Rates

According to data from the 2002 Canadian Tobacco Use Monitoring Survey (CTUMS),[3]

- 21% of Canadians aged 15+ are current smokers (18% are daily smokers and 4% smoke occasionally).
- 23% of Canadian males are current smokers compared to 20% of Canadian women.
- Current smoking rates among teens aged 15 to 19 have been rising since 1990 and are now at 22% (23% of teen females compared to 21% of teen males).
- Current smoking rates in Canada are highest among 20- to 24-year-olds (31%). Males (31%) and females (30%) have similar smoking rates in this age group.
- Daily smokers in Canada smoke an average of 16 cigarettes per day.

Smoking prevalence in Canada has declined over 24% since 1965.[5]

Smoking rates in Canada rose steadily in the 1900s, reaching their peak in the mid-1960s. The decline of smoking coincides with the start of tobacco reduction efforts among governments, health organizations and citizen groups.

Smoking rates began declining in Canada and the western world when the health consequences of smoking were made public in the 1960s with reports such as the U.S. Surgeon General's report on smoking and health (1964).[7]

Canada once had a per capita tobacco consumption that was higher than any other country in the world,[1] but this has changed.

Today, for the population as a whole, smoking is no longer considered the norm: 79% of Canadians, age 15 and over, do not smoke (that is, 77% of males and 80% of females).[4]

There are slightly more Canadians who have quit smoking (25%) than there are smokers (21%).[4] In Alberta, there are almost the same proportion of people who have quit smoking (former smokers) as current smokers: 24% of Albertans age 15 and over are former smokers and 23% are current smokers, according to the 2002 CTUMS.[4]

Not only are fewer Canadians smoking than two decades ago, they are smoking less. In 1981, daily smokers consumed an average of 21 cigarettes per day. Since then, the number of cigarettes smoked has been gradually but steadily declining to the current average of 16 cigarettes per day.[8]

While many patterns of smoking behaviour have changed over the past century, one pattern has remained constant: smokers tend to smoke the most during their mid-life years. In 1998, fewer than one in three smokers aged 15 to 39 smoked more than 20 cigarettes a day. For smokers aged 45 to 49, that proportion increased to almost half, then dropped back to one in three among smokers at age 70. A similar trend can be seen in other years dating back to 1977.[9]

Smokers are starting earlier

The age of smoking initiation has decreased substantially in subsequent birth cohorts (birth groups) over the past decades. The overall decrease for males was modest compared to that for females. For those born early in the century, males reported smoking at a much earlier age than females. A look at the 1956 cohort (group) shows that the mean age of initiation for females converged with that of males at just over 16, and over the next 20 cohorts, the age of initiation continued to decrease slightly for males and females. For those born in 1975, both females and males started to smoke, on average, at just over age 15.[8]

Why Do Young People Start Smoking?

According to the 1994 Youth Smoking Survey by Statistics Canada, the most common reasons teens give for starting to smoke are:[7]

- friends smoke/peer pressure (over 70% of teens say this is the number one reason)
- curiosity/just to try it (smokers and former smokers tend to see this as an important factor)
- "it's cool" (non-smokers tend to stress image-enhancing reasons such as this)

The survey also found that the smoking behaviour of youth is strongly influenced by their social circle. For instance, smokers were more likely to have more than one parent who smoked. They were also more likely to say that their close friends smoked: 79% of smokers aged 15 to 19 reported that over half of their close friends smoked, whereas only 16% of non-smokers said that they had close friends who smoked.[7]

At-Risk Groups

Young Canadians are especially at risk.

While smoking rates in this country have dropped over the past decade, rates among young people substantially increased in the early 1990s and have since been slowly declining. According to the 2000/2001 Canadian Community Health Survey (CCHS),

- Smoking rates for youth have begun to significantly decrease in recent years. The rate for teen smokers aged 12 to 19 climbed in the early 1990s, but has been slowly declining in the past few years to 19% in 2001.[11]
- Young adults aged 20 to 24 still have the highest smoking rate of any age group, at 35%. The smoking rate for males aged 20 to 24, which was 47% in 1981, was 37% in 2001. In 1981, the rate for 20- to 24-year-old females was even higher than that for males, at 50%. In 2001, it was 33%.[11]
- Today, 19% of Canadian teens (12 to 19) smoke.[11]
- More than a third of current and former smokers began smoking before their 15th birthday.[12]

Few people begin smoking after the age of 20,[11] although a study of American college students suggests that this trend could be changing: the study found that 11% of college smokers had their first cigarette on or after 19 years of age, and 28% began smoking regularly on or after that age.[11]

- 38% of current and former smokers aged 12 and over began smoking before their 15th birthday. In fact, 8% of them began smoking between the ages of five and 11 years.[12]
- Overall, males were almost twice as likely as females to have smoked their first cigarette between ages five and 11 years. Alberta had a 9% smoking initiation rate for ages five to 11 years. Nunavut had the highest rate of smoking initiation for this age group at 19%, significantly higher than the Canadian average (8%).[12]

(Refer to the chapter "Youth and Smoking" for more information.)

Other at-risk groups are Aboriginal people, people with a lower formal education, and "blue-collar" workers: all of these groups have higher smoking prevalence rates.

- Aboriginal peoples have much higher smoking rates than the rest of the Canadian population: an estimated 62% of the First Nations population and 72% of the Inuit population smoke,[13] more than double the rate for Canadians as a whole.
- Of the First Nations people and Inuit who smoke, 60% started before the age of 16.[13]
- People with less formal education smoke more than the rest of the population: 33% of people who have less than secondary education smoke, compared to 23% of people with a college or university degree.[10]
- People working in male-dominated, blue-collar industries smoke more than the rest of the population: smoking prevalence among blue-collar workers is 14% to 27% higher than the national average.[10]

Prevalence Rates for Other Tobacco Products

Spit Tobacco

Spit tobacco refers to chewing tobacco and moist or dry snuff. Chewing tobacco is chewed; moist snuff is placed in the mouth between the cheek and gum; dry snuff is inhaled through the nose.

About 1% of Canadians (aged 15+) use spit tobacco. In the mid-1980s, spit tobacco use was found to be higher in Western Canada than it was nationally, and was more common among athletes, Aboriginal people, men working in outdoor occupations and rural men.[17]

According to the 1999 Canadian Tobacco Monitoring Survey (CTUMS), 1.4% of Albertans use spit tobacco. This rate is higher than the national average, and significantly higher than the rates in most of the other provinces (eight of which have rates below 0.5%).[18] These percentages are likely similar today given the small percentage of Canadians and Albertans who use spit tobacco products.

Experimentation rates in Alberta are also high: a 1994 national survey determined that 20% of Alberta youth aged 10 to 19 had tried chewing tobacco or moist snuff, and 7% had tried dry snuff. These rates are over double the national average (8% of Canadian youth had tried chewing tobacco and 3% had tried dry snuff in 1994).[16]

Cigars, Cigarillos and Pipes

Beginning in the mid-1980s, the cigar industry intensified its public relations efforts in the United States through strategies such as cigar dinners, product placement, feature stories, sporting events and the development of cigar-friendly lifestyle magazines (such as *Cigar Aficionado*).[19] Between 1993 and 1998, U.S. prevalence increased by about 50%.[20] Cigar smoking is also on the rise in Canada.

While cigarette smoking has steadily declined in the past decade, cigar prevalence in Canada is now as high as it was in 1986.[21]

About 5% of males (3% of the total population) smoke cigars or cigarillos — that's about 650,000 men aged 15 and older.[18]

Unlike cigar use, pipe use has been declining over the past 30 years. While lifetime use is relatively high (29% for males, 5% for females), current use is at about 1%. Most current pipe users (66%) also smoke cigarettes.[18]

Pipe smoking has long been associated with lip cancer, where the nature of the stem, permeability and, maybe, temperature are cofactors. Some literature suggests that pipes and cigars are less risky for oral cancer than cigarettes, but a study from North Italy shows higher risks associated with these practices for cancer of the mouth and esophagus than cigarettes.[22]

Bidis

Bidis (pronounced bee-dees) are small, hand-rolled cigarettes that are gaining popularity among young people. Made primarily in India, bidis consist of tobacco that is bundled in a tendu or temburni leaf. Tapered at both ends and tied with a colorful string, they look something like marijuana joints. They come in a variety of flavours, including chocolate, strawberry, wild cherry, licorice and grape. Their flavours are youth-friendly, but their contents are not.[23]

Bidis generally contain higher concentrations of nicotine than name brand cigarettes.[24]

While no prevalence data have yet been collected in Canada, studies in the U.S. show that bidi smoking is on the rise among urban youth. A recent survey among young people in Massachusetts found that 40% had smoked bidis at least once in their lifetime, and 8% had

smoked 100 or more in their lifetime.[25] In 1999, the National Youth Tobacco Survey (U.S.) included a question on bidis for the first time. The survey found that the prevalence rate for bidis (5%) was almost as high as the rate for spit tobacco.[26]

Summary

According to the 2002 Canadian Tobacco Use Monitoring Survey (CTUMS) 23% of Albertans aged 15+ are current smokers.[1] The proportion of current smokers in Alberta is 24% among women and 22% among men (22%).[1]

As for the smoking prevalence rates for Alberta teens, age 15 to 19 years, 19% of Alberta teens are current smokers. In fact, 22% of teen females are current smokers while 16% of teen males are current smokers.[1] The highest proportion of never smokers in Alberta are amongst teens age 15 to 19 years (76%).[1]

When comparing the smoking rates of current smokers across all age groups, the highest proportion of current smokers in Alberta is found among young adults age 20 to 24 years (30% are current smokers).[1]

Among current smokers in Alberta, those with lower levels of education are more likely to be daily smokers than are those with higher levels of education. Albertans with the highest level of education are most likely to have never smoked cigarettes.[1]

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APPENDIX A: SMOKING PREVALENCE

CCHS Smoking Prevalence Data for Alberta and Canada

The following estimates are based on the 2000/2001 Canadian Community Health Survey (CCHS). CCHS is a data collection vehicle conducted by Statistics Canada to provide regular and timely cross sectional estimates and information on health determinants, health status and health systems utilization for 136 health regions across Canada. The sample size was 130,000 in 2000/2001.

Alberta: Prevalence Tables

Smoking Status for Albertans Aged 12 and Over: Canadian Community Health Survey 2000/2001

Age Group (in years)	Current Smokers (%)*	Daily Smokers (%)	Occasional Smokers (%)	Former Smokers (%)	Never Smokers (%)
Total (12+)	27.6	22.9	4.7	35.2	36.8
12-19	17.9	12.5	5.4	14.1	67.2
20-24	37.8	28.0	9.8	26.3	35.8
25-34	34.1	28.7	5.4	29.5	36.1
35-44	32.1	28.1	4.0	36.7	31.0
45-54	29.5	25.6	3.9	42.3	27.7
55-64	23.8	21.3	E	48.7	26.9
65+	12.9	10.3	E	52.2	34.2

* Includes both daily smokers and occasional smokers

"E" – results not reliable because of small numbers

Source: Statistics Canada. Canadian Community Health Survey: Smoking status, by age group and sex, household population aged 12 and over, Canada, provinces, territories, health regions and peer groups 2000/2001. Health Indicators, May 2002. Catalogue no. 82-221-XIE.

Smoking Status by Gender for Albertans Aged 12 and Over: Canadian Community Health Survey 2000/2001

Gender	Age Group (in years)	Current Smoker (%)*	Daily Smoker (%)	Occasional Smoker (%)	Former Smoker (%)	Never Smoker (%)
Male	Total (12+)	29.6	24.8	4.8	38.1	31.7
	12-19	16.5	11.5	E	14.3	68.4
	20-24	41.1	30.3	E	25.3	33.4
	25-34	38.6	32.7	5.9	29.9	30.8
	35-44	34.4	30.1	E	38.3	27.2
	45-54	31.4	27.3	E	46.4	21.8
	55-64	24.2	22.1	E	54.1	20.5
	65+	13.5	11.6	E	68.5	17.1
Female	Total (12+)	25.5	21.0	4.5	32.2	42.1
	12-19	19.4	13.6	E	13.9	65.9
	20-24	34.2	25.5	E	27.5	38.3
	25-34	29.4	24.6	E	29.1	41.5
	35-44	29.7	26.0	E	35.1	34.9
	45-54	27.5	23.9	E	38.1	34.1
	55-64	23.4	20.6	E	43.5	33.1
	65+	12.4	9.2	E	38.7	48.4

* Includes both daily smokers and occasional smokers

"E" – results not reliable because of small numbers

Source: Statistics Canada. Canadian Community Health Survey: Smoking status, by age group and sex, household population aged 12 and over, Canada, provinces, territories, health regions and peer groups 2000/2001. Health Indicators, May 2002. Catalogue no. 82-221-XIE.

Canada: Prevalence Tables

Smoking Status for Canadians Aged 12 and Over: Canadian Community Health Survey 2000/2001

Age Group (in years)	Current Smokers (%)*	Daily Smokers (%)	Occasional mokers (%)	Former Smokers (%)	Never Smokers (%)
Total (12+)	25.9	21.5	4.4	36.7	37.2
12-19	18.7	12.9	5.8	14.7	66.1
20-24	35.0	26.5	8.5	25.8	38.9
25-34	31.9	25.9	6.0	30.3	37.6
35-44	31.6	27.1	4.5	36.8	31.3
45-54	28.3	24.9	3.4	43.3	28.2
55-64	21.6	19.1	2.5	49.6	28.6
65+	12.0	10.4	1.6	51.6	36.0

* Includes both daily smokers and occasional smokers

Source: Statistics Canada. Canadian Community Health Survey: Smoking status, by age group and sex, household population aged 12 and over, Canada, provinces, territories, health regions and peer groups 2000/2001. Health Indicators, May 2002. Catalogue no. 82-221-XIE

Terminology

(Note: These definitions are taken from the Canadian Community Health Survey)

Current Smoker: was smoking at the time of the interview, and includes daily and non-daily smokers.

Former Smoker: was not smoking at the time of the interview, but answered "Yes" to the question, "Have you smoked at least 100 cigarettes in your life?"

Never Smoker: was not smoking at the time of the interview and answered "No" to the question, "Have you smoked at least 100 cigarettes in your life?"

Smoking Status by Gender for Canadians Aged 12 and Over: Canadian Community Health Survey 2000/2001

Gender	Age Group (in years)	Current Smoker (%)*	Daily Smoker (%)	Occasional Smoker (%)	Former Smoker (%)	Never Smoker (%)
Male	Total (12+)	28.0	23.5	4.5	39.6	32.0
	12-19	17.6	12.1	5.5	14.6	67.1
	20-24	37.3	29.0	8.3	26.2	36.1
	25-34	35.7	29.7	6.0	29.3	34.7
	35-44	33.8	29.2	4.6	36.9	28.9
	45-54	31.1	27.3	3.8	46.7	21.9
	55-64	22.9	20.3	2.6	56.9	20.0
	65+	13.2	11.7	1.5	67.7	18.7
Female	Total (12+)	23.7	19.4	4.3	33.9	42.2
	12-19	19.8	13.6	6.2	14.8	65.1
	20-24	32.6	24.0	8.6	25.4	41.8
	25-34	28.0	22.0	6.0	31.3	40.5
	35-44	29.2	24.9	4.3	36.8	33.8
	45-54	25.7	22.6	3.1	40.0	34.3
	55-64	20.4	18.0	2.4	42.4	37.0
	65+	11.2	9.5	1.7	39.1	49.5

* Includes both daily smokers and occasional smokers

Source: Statistics Canada. Canadian Community Health Survey: Smoking status, by age group and sex, household population aged 12 and over, Canada, provinces, territories, health regions and peer groups 2000/2001. Health Indicators, May 2002. Catalogue no. 82-221-XIE

Rows that do not add up to 100% are a result of a smoking status not stated.

ECONOMICS OF TOBACCO USE

Quick Facts

- Taxation is an effective method for reducing tobacco consumption, especially among youth.[1]
- Following a major tobacco tax increase in March 2002, Alberta Government tobacco tax revenues increased 65% from 2002 to 2003,[2,3] and contributed to a 24% decrease in cigarette sales.[4]
- In an AADAC 2003 public opinion survey, 56% of Albertans supported higher tobacco taxes as a means to prevent youth smoking.[5]
- Albertans with annual household incomes less than $45,000 per year have higher smoking rates than Albertans with annual household incomes in excess of $45,000.[6]
- In Alberta, a pack-a-day smoker spends $3,770 on cigarettes each year, based on an average cost of $10.35 per pack.
- The Conference Board of Canada estimated in 1997 that it costs employers about $2,500 more per year to employ a smoker than to employ a non-smoker.[7]
- One third of Alberta employers surveyed thought that employee tobacco use was a serious problem in 2002.[8]
- Between 1997 and 2001, fires caused by smokers' materials cost Albertans $46 million in property damage, and led to 40 deaths and over 280 injuries.[9]
- In 1992, tobacco use was estimated to cost the Alberta economy $728.6 million each year, which included $215.4 million in direct health care costs.[10]

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Tobacco Taxation

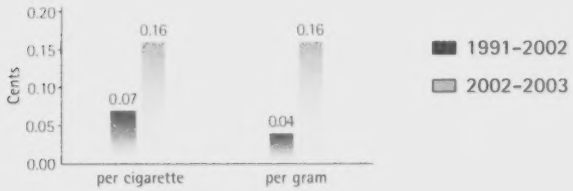
Governments have many economic options available to curb the use of tobacco by their citizens, one of the most effective being increased taxation. Tobacco taxation has been reported as an effective means for lowering cigarette consumption.[1-3] The Surgeon General's report in the U.S. concluded that raising tobacco prices is good public health policy because high prices reduce the smoking rates, especially among youth.[4] Studies have reported that a price rise of 10% on a pack of cigarettes reduces the demand for cigarettes by about 4% in high-income countries like Canada[5,6] and 8% in low-income nations (where people are generally more responsive to price changes).[5]

In Canada, increased taxation has affected cigarette consumption. When Canadian tobacco taxes increased from an average of $0.46 in 1980 to $3.72 in 1991,[7]

- Cigarette sales fell 39%.
- Tobacco consumption decreased 30% faster than in the United States (where tobacco taxes are much lower).
- Smoking by teenagers was cut by two thirds.

In Alberta, between 1985 and 1995, cigarettes increased in price by 78%, while per capita consumption decreased by 43%.[8] In March 2002, the Alberta government implemented the largest single tobacco tax increase in Canadian history (see Figure 1). This tax hike also included cigars, with a tax increase from 80% to 183% of the cigar retail price. However, in August 2003, the government of Alberta reduced the cigar tax rate to 95% of the retail price, to bring it back in line with neighbouring provinces.[11,12]

Figure 1. Alberta Tax Rate on Cigarettes and Loose Tobacco, 1991–2003



Source: 1. Alberta Revenue. Offences, penalties, and enforcement. Information circular TTA-2R1. Edmonton, AB: Alberta Revenue, 2000.[7]

2. Alberta Revenue. Alberta Tobacco Tax Act Special Notice: Special Notices/Bulletin. 3(3). Edmonton, AB: Alberta Revenue, Tax and Revenue Administration, 2002.[10]

Government Revenue from Tobacco

Tobacco taxes vary widely from province to province. Generally the federal and provincial governments take about 55 to 75% of the cost of cigarettes in taxes,[13] and these tobacco taxes contribute to government revenues.

In Alberta, government revenue from tobacco taxes was relatively stable from fiscal years 1991/1992 to 2001/2002. This was also a period where tobacco taxes were relatively stable. Following the tax increase in March 2002, government revenues from tobacco increased 65% from 2001/2002 to 2002/2003 (see Figure 2).

Figure 2. Alberta Provincial Government Revenues from Tobacco Tax, 1993/1994 to 2002/2003

Sources: 1. National Clearinghouse on Tobacco and Health. Alberta revenues from tobacco tax (in dollars), 1979/80 – 2000/2001. Canadian Council for Tobacco Control, 2003.[14]

2. Alberta Revenue. Annual Report 2001-2002. Edmonton, AB: Alberta Revenue, 2002.[15]

3. Alberta Revenue. Annual Report 2002-2003. Edmonton, AB: Alberta Revenue, 2003.[16]

The federal government also collects revenue from tobacco in the form of excise duty and excise tax. Figure 3 displays federal government revenue from both of these sources. Note that in 1994/1995 the federal government reduced the excise tax rates in an effort to reduce cigarette smuggling.

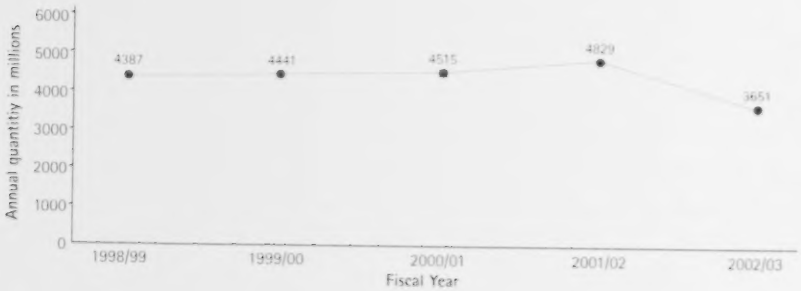
Figure 3. Federal Tax Revenues from Tobacco, 1993/1994 to 2000/2001

Source: National Clearinghouse on Tobacco and Health. Revenues from tobacco taxation, all categories, federal government (in dollars), 1979/80 – 2000/2001. Canadian Council for Tobacco Control, 2003.[17]

Tobacco Taxation and Consumption of Tobacco

Consumption of tobacco products in Alberta has been decreasing since the 1980s. Domestic cigarette sales in Alberta declined from 7.1 billion cigarettes in 1980 to 4 billion in 2002.[18] The tobacco tax increase in Alberta, announced in March 2002, contributed to a 24% decrease in cigarette sales volume in the 2002/2003 fiscal year (see Figure 4).[19,20]

Figure 4. Cigarette sales volumes in Alberta, 1998/1999 to 2002/2003



Source: Alberta Revenue. Annual sales volumes of cigarette equivalents in Alberta 2003. Edmonton, AB: Alberta Revenue, 2003.[20]

The following are cigarette consumption tends in Canada. As can be seen, consumption on a national level is decreasing.[3]

Cigarettes consumed per adult in Canada (15 years and older)	
1970	3,301
1980	3,549
1990	2,030
2000	1,777

Global consumption of cigarettes has been rising steadily, and worldwide more people are smoking, and smokers are smoking more cigarettes. Consumption of manufactured cigarettes increased from 1970 to 2000, from 3.1 trillion to 5.5 trillion cigarettes.

Tobacco Taxation and Youth Smoking

Youth are more affected by price increases in tobacco than older adults. This may be because they have less disposable income, may not be as yet heavily addicted to nicotine, and are more peer influenced than older people.[3] However, while increased taxation may

contribute to a reduction in youth smoking rates, 78% of youth in grades 7 to 12 in Alberta perceive that they have easy access to cigarettes.[23]

Part of the reason why youth feel it is easy to obtain cigarettes is that they get most of their cigarettes from social (informal) sources, rather than commercial (retail) sources. Tax increases directly affect the ability of youth to obtain cigarettes from commercial sources, but the effect of tax increases on the availability of cigarettes from social sources is uncertain (see Table 1).

Table 1. Source of Cigarettes among Alberta Youth

Commercial Sources		Social Sources	
Small grocers	31%	Given by friend or someone else	52%
Gas stations	29%	Bought from a friend or someone else	34%
Other stores	15%	Taken from a parent or sibling	18%
Drug stores	9%	Given by sibling	8%
Supermarkets	8%	Given by parent	8%
Vending machines	7%		

Source: AADAC. The Alberta Youth Experience Survey 2002.[24] Customtabulations. Edmonton, AB: AADAC; 2003

According to the AADAC 2003 Public Opinion survey, 56% of people surveyed, supported increased tobacco taxes to prevent youth from smoking. Females (59%) supported tax increases slightly more than males (54%). Non-smokers were more supportive than smokers of tax increases to prevent youth smoking (66% versus 27% respectively).[25]

Income Levels and Smoking

Smoking status among Albertans appears to vary by the level of household income in the past year, and by level of income adequacy as determined by Statistics Canada. In general, Albertans with lower annual household incomes (i.e. less than $45,000 in the past year) have higher smoking rates than Albertans with annual household incomes in excess of $45,000.

Comparing level of income adequacy to smoking status among Albertans age 15+ years, the 2002 Canadian Tobacco Use Monitoring Survey indicates that smoking rates are higher among Albertans whose income is considered to be "low" by Statistics Canada. In contrast, the prevalence of smoking is lowest among Albertans with the highest levels of income adequacy. See Table 2 below.

Table 2. Smoking Status by Level of Income Adequacy, Age 15+, Alberta, 2002 CTUMS (annual)

Income Adequacy	Daily Smoker (%)	Occasional Smoker (%)	Do Not Smoke at All(%)
Low	29%	7%	65%
Medium low	21%	6%	73%
Medium	21%	4%	75%
Medium high	13%	—	84%
High	14%	5%	81%

"—" indicates an estimate of marginal reliability that is not reported.

Source: Statistics Canada: 2002 Canadian Tobacco Use Monitoring Survey (annual). Ottawa, ON: Statistics Canada, 2003.[26]

Costs of Tobacco Use

This section examines some of the costs associated with tobacco use. These costs occur at the individual, employer, provincial, national, and global levels.

Table 3. Examples of Types of Costs Associated with Tobacco Use:

Direct Costs	Indirect Costs
Health care (e.g. hospital, physician, ambulance, prescription drugs, long term care, external effects on non-smokers etc.)	Productivity losses because of sickness and death
Workplace losses (e.g. health programs)	Pain and suffering of smoker and family
Prevention and research for tobacco cessation	Litter/waste
Fire damage costs	
Tobacco subsidies	
Insurance premium costs	

While most of these costs are borne by the public sector, most of the profits from tobacco remain within the private sector.[27]

Household Costs to Smokers

In 2002, average annual household expenditures in Alberta on tobacco products and smokers' supplies rose to $904 from $671 in 2001. That is, the average annual household expenditures in Alberta on tobacco products and smokers' supplies increased 34.7% from 2001 to 2002. However, the percent of Alberta households reporting expenditures on tobacco products and smokers' supplies declined by 7.5% from 2001 to 2002. Albertans continue to spend more, on average, than

other Canadians on tobacco products and smokers' supplies. This finding holds true when comparisons are made over time from 1997 through 2002 (Table 4).

Table 4. Household spending on tobacco products and smokers' supplies, Alberta and Canada, 1997–2002

Area	Tobacco products and smokers' supplies	1997	1998	1999	2000	2001	2002
Alberta	Average annual expenditure	$650	$621	$635	$609	$671	$904
	Percent of households reporting expenditures on tobacco products	46.4	44.5	45.0	41.4	45.3	41.9
Canada	Average annual expenditure	$551	$560	$548	$541	$612	$728
	Percent of households reporting expenditures on tobacco products	44.1	43.1	41.4	39.9	39.8	39.1

Source: Statistics Canada. Household spending on tobacco and alcoholic beverages by province and territory, annual. Table 203-0013. Ottawa, ON: Author, 2003.[24]

The individual cost to a smoker's health is enormous, as are the financial costs. Smokers pay higher life insurance premiums and, as a group, contribute billions of dollars in taxes that non-smokers never have to pay.

Smoking is associated with the costs of physical damage (such as cigarette burns on skin, clothing, and furniture). There are other financial costs (job opportunities restricted to non-smokers) and human costs (potential mates and residences restricted to non-smokers).[25] Non-smokers also pay a health cost from smoking, though economic assessments to date have been incomplete.

And then there's the cost of cigarettes themselves. In Alberta, a smoker who smokes a pack a day spends more than $3,770 each year on cigarettes, based on an average price of $10.35 per pack.

Costs to Employers

Some of the highest costs to Canadians are paid by the business sector.

Employers who argue that they cannot afford to help their employees cut down or quit smoking may not have calculated the added costs of employing a smoker. In 1997, the Conference Board of Canada estimated that it costs employers about $2,565 more per year to employ a smoker than to employ a non-smoker.[10]

A 2003 report from AADAC highlighted key concerns for employers at their workplaces. Employers were asked about the seriousness of employee substance abuse and gambling for their organization and industry. Employee tobacco use was the most important concern for employers in their organization or in their industry in 2002. Additionally, 19% of employers reported employee tobacco use to be associated with arriving late for work and/or taking too many breaks to smoke.

The annual excess cost of employing smokers compared to non smokers (per employee).

Cost Factor	Cost
Increased absenteeism	$230
Decreased productivity	$2,175
Increased life insurance premiums	$75
Smoking area costs	$85
Total	$2,565

Costs to Albertans

Tobacco use is responsible for substantial economic costs to the province in terms of health care expenditures, lost productivity, fires and property damage. Table 5 illustrates two differing estimates of some of the societal costs of tobacco use in Alberta. The first estimate is from the Canadian Centre on Substance Abuse using 1992 data.[32] Total societal costs of tobacco use in Alberta were reported to be $729 million in 1992.

The second estimate updates the Canadian Centre on Substance Abuse study to 2002 by using the Consumer Price Index (CPI) with 1992 as the base year. The all-item CPI from 1992 to 2002 is 124.2.[34] This means that an item costing $1.00 in 1992 would cost $1.24 in 2002. Using these CPI figures, $908 million in societal costs to the Alberta economy due to tobacco use can be estimated for 2002. Clearly, there is a need for more research on the cost of tobacco use in Alberta.

Table 5. The Cost of Tobacco Use in Alberta

Cost	Based on Canadian Centre for Substance Abuse[32] (1992)	Update to Canadian Centre for Substance Abuse (2002)*
Direct health care costs	$215.4 million	$270.4 million
Indirect costs: productivity losses (because of death or illness)	$508.2 million	$631.2 million
Direct costs associated with fire damage	$1.2 million	$1.5 million
Direct costs for prevention and research	$3.6 million	$4.5 million
Direct losses associated with the workplace	$37,000	$46,000
Total	**$728.6 million**	**$907.7 million**

*For direct health care costs, CPI value of 125.5 was used, and for all other categories, CPI value of 124.2 value was used.[35] Totals may not add up correctly because of rounding.

Source: Single E, Robson L, Xie X, Rehm J. The costs of substance abuse in Canada. Ottawa, ON: Canadian Centre on Substance Abuse, 1996.[32]

Costs from fire

In Alberta, between 1997 and 2001, 2,310 fires caused by smokers' materials cost Albertans an estimated $46 million in property damage. In addition, 40 deaths and 284 injuries due to fires caused by smokers' materials were recorded.[35]

Table 6. Fires Caused by Smokers' Material in Alberta

Year	Number of fires	Fire deaths	Fire injuries	Property Loss
1997	500	9	81	$7,610,200
1998	472	4	48	$7,234,491
1999	429	11	67	$5,834,109
2000	411	5	35	$9,912,953
2001	498	11	53	$15,778,586
Five year total	**2,310**	**40**	**284**	**$46,370,339**

Source: Fire Commissioner's Office. Alberta fire losses caused by smoker's material: 1997-2001. Edmonton, AB: Alberta Municipal Affairs, 2003.[35]

Costs to Canadians

A report published by the Canadian Centre on Substance Abuse calculated the costs associated with smoking in Canada in 1992 to be $9.5 billion.[32] Other estimates of the costs of smoking in Canada in 1991 are $13 billion,[13] but the more conservative figures are reported in Table 7 below.

Table 7. The Cost of Tobacco Use in Canada, 1992

Cost	Canada (in millions)
Direct health care costs	$2,675
Direct losses associated with the workplace	$0.4
Direct costs for prevention and research	$48
Direct costs associated with fire damage	$17.1
Indirect costs: productivity losses (because of death or illness)	$6,819
Total	**$9,559.5**

Source: Single E, Robson L, Xie X, Rehm J. The costs of substance abuse in Canada. Ottawa, ON: Canadian Centre on Substance Abuse, 1996.[32]

How would a drop in smoking rates affect costs in Canada?

The Canadian Council for Tobacco in 1999 estimated the effects of a 1% reduction in smoking prevalence per year on direct health care costs in Canada. Overall, this amounted to a national cost savings of $65.7 million. These estimates account for direct health care costs such as hospitals, physicians, and research but do not include indirect costs such as productivity losses, reflecting a lower estimation of the

actual cost. The following table shows the cost avoidance estimates for specific tobacco-related diseases.[36]

Table 8. Cost Avoidance from Smoking Reduction in Canada, 1999

Disease	Decrease in the number of cases because of a 1% drop in smoking rates	Avoidance in health care costs (millions of dollars)
Cancer of the mouth	62	$1.8
Lung cancer	98	$2.3
Heart disease	2,835	$26.0
Cerebrovascular disease	592	$19.5
Chronic obstructive pulmonary disease (COPD)	1,263	$16.1
Total cost avoidance in 1999		**$65.7**

Source: Canadian Council for Tobacco Control: Impact of anti-tobacco campaign on direct health care costs in Canada. Ottawa, Ontario: Canadian Council for Tobacco Control; 2002.[36]

Costs to Developed Nations

In the United States between 1995 and 1999, smoking was estimated to cost $157 billion (U.S.) annually, including direct health care expenditures and lost productivity.[35] This estimate is higher than the $130 billion figure estimated in 1998 by the United States Department of the Treasury.[37] The United States Department of the Treasury study included direct medical costs, lost workdays, reduced productivity from death, and smoking induced fires. In the United States smoking related fires cost an estimated $6.95 billion and $27.2 billion globally in 1998 dollars.[38]

In Australia, the social costs (including direct health care costs) of smoking for 1998/1999 were estimated at $21 billion Australian, about 61% of the total social costs of drug abuse for that country.[39] Clearly, estimates of the costs to developed nations are large.

Costs to Developing Nations

$70 billion (U.S.) of global losses occur in the developing world.[27]

Until recently, developing nations enjoyed some of the revenues of tobacco without incurring many of the costs. This is because prevalence of smoking in many of these countries was low. But tobacco companies have begun to target developing nations (to compensate for losses in developed nations) and smoking rates have climbed.[27]

Cigarettes can be a financial drain on families in developing nations, accounting for 25% or more of a person's disposable income. For poorer households, the impact of this expenditure can result in a trade-off between food and tobacco.[27]

Summary

Taxation is an effective means of reducing tobacco consumption. The Alberta Government's 2002 increase in tobacco taxation has reduced cigarette consumption in the province, and also increased government revenues. Youth are more price-sensitive than adults, so increased taxation is an especially effective measure in reducing youth smoking.

While the tobacco industry is an important part of many countries' economic vitality, research shows that the measurable costs of tobacco use are high at all levels.[10] Individuals, employers, provincial and national governments, and society as a whole all pay the costs associated with smoking. These costs can be enormous, especially the costs associated with human life.

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HEALTH CONSEQUENCES OF SMOKING CIGARETTES, CIGARS AND PIPES

Quick Facts

- Tobacco use is considered the single most significant cause of preventable morbidity (disease) and mortality (death) in Canada and in most other developed countries.[1]
- Smoking causes lung cancer and cancers of the mouth, pharynx (throat), larynx (voice box) and esophagus.[2,3,4]
- Smoking is a contributing cause of cancers of the bladder, kidney, and pancreas.[2,5]
- An estimated 18,347 Canadians died from tobacco-related cancers in 1998.[6]
- In 1998, 2,591 individuals in the prairie provinces died from tobacco-related cancers.[6]
- Smoking causes respiratory diseases, including chronic obstructive pulmonary disease (COPD).[7]
- An estimated 10,618 Canadians died from tobacco-related respiratory diseases in 1998.[6]
- In 1998, 1,714 individuals in the prairie provinces died from tobacco-related respiratory diseases.[6]
- Smoking causes cardiovascular diseases, including ischemic heart disease, stroke and diseases of the blood vessels.[2,8-12]
- An estimated 17,413 Canadians died from tobacco-related cardiovascular diseases in 1998.[6]

- In 1998, 3,170 individuals in the prairie provinces died from tobacco-related cardiovascular diseases.[6]
- Switching to "light" cigarettes does not lower the risk of tobacco-related disease.[13]
- Light cigarettes can yield levels of tar, nicotine and carbon monoxide that are much higher than the levels recorded on the sides of the cigarette packages.[14]

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HEALTH CONSEQUENCES OF SMOKING CIGARETTES, CIGARS AND PIPES

Cigarettes have changed dramatically over the past 50 years; however, the disease risk associated with smoking has not.[1]

Tobacco use is considered the single most significant cause of preventable illness, disability and mortality in Canada and in most other developed countries.[2] The health hazards of tobacco use are a major concern worldwide not only in industrialized countries but also in low-income countries.[3]

Many adults in Canada know that cigarette smoking is a serious health hazard, and that even occasional smoking is risky.[4] In fact, in the 2003 AADAC Public Opinion Survey, 72% of respondents strongly agreed that tobacco has no safe level of use. A large proportion of respondents (91%) strongly agreed that tobacco is a dangerous, cancer-causing substance. In addition, 66% strongly agreed that the full range of negative effects of tobacco goes far beyond what most people understand.[5]

Tobacco smoke contains over 4,000 chemicals. About 50 of them, such as tar, ammonia, carbon monoxide, oxides of nitrogen, and benzopyrene, can cause, initiate or promote cancer.[6] The following lists examples of chemicals found in tobacco smoke and provides examples of products that contain these same chemicals:[7]

Chemicals found in tobacco smoke	Used in other products
acetone	paint stripper
ammonia	floor cleaner
arsenic	ant poison
butane	lighter fuel
cadmium	car batteries
carbon monoxide	car exhaust fumes
DDT	insecticide
hydrogen cyanide	poison gas
methanol	rocket fuel
naphthalene	moth balls
toluene	industrial solvent
vinyl chloride	plastics

Although the amount of chemicals in each cigarette is small, its effect is cumulative. That is, the amount stored in the body increases with each puff of a cigarette. There are just over 10 puffs per cigarette.

In a one-year period, at a rate of one pack of cigarettes a day, a smoker will inhale about 73,000 puffs of dangerous chemicals.[6]

Besides causing cancer, smoking has been linked to causing lung disease, heart disease and many other health problems. The section outlines some of the known health effects of smoking.

Cancer

Lung cancer

How does cancer attack the lungs?

Cigarette smoke inhibits and damages the normal cleaning process by which the lungs get rid of foreign and harmful particles. Smoke destroys an important cleansing layer in the lungs, which in turn causes a build-up of mucus (resulting in "smoker's cough," an alternative way that the lungs use to try to clean themselves). The harmful cancer-producing particles in cigarette smoke are thus able to remain lodged in the mucus and develop into cancer tumors.[5]

Lung cancer rates in Alberta and Canada

Researchers have known for almost 50 years that smoking causes cancer. Lung cancer was the first cancer to be linked to smoking and, of all the tobacco-related cancers, has had a significant impact on the health of people.[1]

Smoking is responsible for 90% of all lung cancer cases.[7] In Canada, smoking caused about 18,347 cancer deaths in 1998 — and about 2,591 of those occurred in the prairie provinces.[9]

Lung cancer rates in women are rising.

Lung cancer rates follow smoking prevalence rates (with a latency period of about 20 to 30 years from regular smoking exposure to onset of cancer). In Canada, following several decades of rapid increase, the rate of lung cancer incidence and mortality rates among young women began to level off in 1993. This reflects a decline in smoking prevalence rates among young women that began in the mid-1970s (whereas smoking among men began dropping off in 1965). Because of the 20- to 30-year lag in cancer development, we are continuing to see an increase in lung cancer incidence and mortality rates among women.[10]

In fact, since 1993 lung cancer surpassed breast cancer as the leading cause of cancer death among Canadian women.[10,11] Today, the lung cancer incidence and mortality rates amongst women remain roughly three to four times as high as rates in 1973, but are only half as high

as the rates among men.[10] (Refer to the "Tobacco-Attributable Mortality" chapter for more information.)

Strong evidence suggests that for the same number of cigarettes smoked, women are more susceptible than men to the carcinogenic effects on their lungs. Evidence also is growing that lung function in women is more adversely affected by smoking and that smoking may be a stronger risk factor for myocardial infarction in women than it is in men.[11]

Other cancers

Lung cancer is not the only tobacco-related cancer. A review conducted by Kuper, Boffetta and Adami in 2002 assessed the use of tobacco and its link to specific types of cancers.[12] At least eight other cancers are linked to smoking.

Organs that come into direct contact with smoke are at greatest risk for cancer in smokers.[13] In addition to lung cancer, smoking is a major cause of cancers of the[12,13]

- mouth
- pharynx (throat)
- larynx (voice box)
- esophagus

Smoking is directly responsible for 92% of cancers of the mouth, pharynx and larynx in men, and 61% in women.[12]

Nearly 80% of esophageal cancers are attributable to smoking. The disease is more common in men than in women.[14]

Organs and tissues that do not come into direct contact with smoke are also at risk for cancer because the carcinogens (cancer-causing chemicals) are absorbed into the bloodstream and circulate through the organs. Smoking is a contributing cause of cancers of the [12,14]

- bladder
- kidney
- pancreas

A potential link between breast cancer and tobacco has also been studied, but the findings are contradictory. While some studies point to an increased risk,[15,16] the majority of studies find no association.[17] A recent review by 29 experts with the International Agency for Research on Cancer concluded that there is clear evidence that smoking causes little or no risk of breast cancer.[17]

Many other cancers may be related to tobacco use, including cancer of the stomach, colorectal cancer, liver cancer, and some forms of leukemia. Evidence suggests that smokers are at increased risk for these cancers, but further research is needed to determine whether or not the association is causal.[12,13]

Other forms of cancer, including ovarian and prostate cancer, are unlikely to be linked to tobacco use.[12]

Respiratory Diseases

Smoking can cause a number of diseases that permanently damage the lungs and airways of smokers. There is no cure for these diseases and no way to reverse the damage.

Smoking causes pulmonary and respiratory diseases. An estimated 10,618 Canadians and 1,714 individuals in the prairie provinces died of respiratory diseases caused by smoking in 1998.[9]

The respiratory diseases associated with smoking are often grouped together and referred to as chronic obstructive pulmonary disease or COPD. These diseases include[21]

- emphysema
- chronic bronchitis
- asthmatic bronchitis

Smoking causes about 75% of chronic bronchitis and emphysema cases.[7] Symptoms include chronic cough or wheezing, accompanied by trouble breathing. Approximately 10 to 15% of all smokers will develop COPD at some point in their lives.[22]

COPD is considered a "silent" killer in that affected persons do not experience significant symptoms until the disease becomes severe. Because of this, many COPD patients who smoke do not seek medical attention at a time when smoking cessation might help to stabilize the disease.[23]

COPD is one of the leading causes of death in Canada and is mostly preventable.[3] Smoking is the single most important risk factor for COPD. In fact, smokers are 10 times more likely to die from COPD than non-smokers.[24]

In addition, smokers are at increased risk for influenza and pneumonia. Smokers can have a "blunted" or decreased immune response to the influenza vaccination, and are significantly more likely to die of influenza or pneumonia than non-smokers.[24]

Substantial evidence suggests that smoking affects asthma adversely. Exposure to environmental tobacco smoke (also referred to as "second-hand smoke" or "passive smoking") in children, especially maternal smoking, may be a significant risk factor for asthma. Environmental tobacco smoke exposure for those with established asthma is not only associated with more severe symptoms, but also with lower quality of life, reduced lung function, and increased health care utilization for asthma. Although active smoking appears not to be a significant risk factor for asthma, it is associated with reduced lung function and asthma-related mortality.[25] (Refer to the chapter "Environmental Tobacco Smoke" for more information.)

A review of the literature by Benninger (1999) found that tobacco smoking and ETS have been associated with significant nasal and sinus disease and cancer. ETS exposure is associated with acute and chronic nasal symptoms in adults and children and snoring in children and teenagers. It also may be associated with an earlier onset and more significant symptoms for individuals with a predisposition to developing allergies.[26]

Emphysema is a severely debilitating lung disease, which occurs when the alveoli (air sacs) become damaged, causing the surrounding airways to collapse.[5]

Cardiovascular Diseases

Smoking also causes heart disease, stroke and diseases of the blood vessels. In fact, about 25% of ischemic heart disease cases are a result of smoking.[7] About 17,413 Canadians and 3,170 individuals in the prairie provinces died from tobacco-related cardiovascular disease in 1998.[9]

Smoking is a major risk factor that contributes to cardiovascular disease, a major cause of death in Canada. Smoking, as well as exposure to second-hand smoke, has an immediate effect on the heart and makes the heart work harder in the following ways:[27]

1. Decreases the amount of oxygen that is carried in the blood

Carbon monoxide and other gases compromise the amount of oxygen in the blood so that the heart has to work harder to get an adequate supply of oxygen.[28]

2. Increases the heart rate

The nicotine in tobacco causes the heart rate to increase and can elevate blood pressure. The heart beats faster to get more oxygen by pumping a greater volume of oxygen-poor blood.[28]

3. Decreases the size of blood vessels

A build-up of fat deposits associated with nicotine and carbon monoxide makes blood vessels and arteries smaller, which limits the blood supply to the heart.[28]

Not surprisingly, smokers are also at increased risk for more frequent and severe colds.[29]

Over time, smoking can cause severe damage to the heart and arteries, and can lead to the following conditions:

1. Heart attack and sudden death

Studies have shown smokers to be at two to four times greater risk for heart attacks and sudden death from coronary heart disease than non-smokers.[22]

Smokers have a 70% chance of dying from coronary heart disease (CHD). This is the build-up of fat deposits in the blood supply system.

In fact, smoking more than 40 cigarettes a day increases one's chance of dying by 200% to 300% in comparison to non-smokers.[30]

Smoking cessation reduces the risk of tobacco-related cardiovascular disease by approximately 50% within one year, and to normal levels (that is, to the levels of people who have never smoked) within five years.[28]

2. Stroke

Cigarette smoking is a well-known risk factor that contributes to, and significantly increases, the chances of having a stroke. Several major studies have shown this to be the case.The risk of stroke is approximately 50% higher in smokers than in non-smokers and is dose-dependent. The risk increases with the number of cigarettes smoked per day. Thus, smokers who consume more than 25 cigarettes per day have the highest risk of a stroke.[27,31,32]

3. Peripheral vascular disease

Cigarette smoking is a major cause of peripheral vascular disease ("poor circulation"). This is a painful condition in which plaque forms in the arteries of the legs, constricting blood flow. This can cause pain and trouble walking and, in extreme cases, can lead to amputation.[33]

4. Aortic aneurysm

An aortic aneurysm is a bulging or ballooning of the wall of the body's largest artery, the aorta. Most aortic aneurysms are asymptomatic (show no symptoms) as they enlarge, and may rupture and cause instant death. Smoking is the risk factor most strongly associated with abdominal aortic aneurysm.[34]

Other Health Problems

Smoking is associated with a number of other health problems.

In addition to cancer and respiratory and cardiovascular diseases, growing evidence links smoking to a number of other health problems, where it may increase the severity or likelihood of occurring. This includes health problems such as

- cataracts[35]
- erectile dysfunction (impotence)[36]
- gastroesophageal reflux disease (symptoms include heartburn and acid regurgitation)[37]
- hoarseness and vocal cord inflammation[17]
- hormone-related problems (including earlier female and male menopause)[38,39]

- increased injuries[40-42] (including increased motor vehicle collisions, fire-related injuries,[43] and exercise-related injuries)
- increased severity of rheumatoid arthritis [44, 45]
- infertility in men and women[46-50]
- menstrual disorders[51]
- sleeping problems[52]
- thyroid disease[53, 54]
- tooth and gum damage[55, 56]
- ulcers and bowel disorders (e.g. Crohn's Disease)[57, 58]

Women smokers who use oral contraception are at even greater risk for ischemic stroke and myocardial infarction (heart attack), particularly women over 35.[59]

Erectile dysfunction (impotence) is estimated to occur in 52% of all men aged 40 to 70 years.[60] Cigarette smoking almost doubles the likelihood of moderate or complete erectile dysfunction. Cigar smoking and exposure to environmental tobacco smoke (ETS) also significantly increases the risk of impotence.[61]

The probability of erectile dysfunction is increased in males with chronic disease (e.g. heart disease, hypertension, diabetes) who are also smokers. In a recent study, non-smokers with heart disease had a 21% probability of erectile dysfunction, while smokers with heart disease had a 56% probability.[59]

Smoking and Genetics

While the cigarette-induced harm to human health is indiscriminate (that is, affecting both smokers and non-smokers) and severe, the degree of damage also varies from individual to individual. This variability in cigarette-induced effects is partly genetically mediated. Through population studies, researchers have learned that carriers of certain variants in some genes may be more susceptible to cigarette-induced lung cancer. While we still know little about the genetic basis and molecular pathways for cigarette-induced pathological changes, understanding these mechanisms will be of great value in designing strategies to further reduce smoking in targeted populations, and to implement more effective measures in prevention and treatment of cigarette-induced diseases.[63]

The "Light" Myth

Switching to "light" or "mild" cigarettes does not necessarily lower the risk of tobacco-related disease.[64]

Most smokers believe that light cigarettes are less damaging because they have lower amounts of tar, nicotine and carbon monoxide. But the amounts indicated on the side of the package are misleading. Research has shown that light cigarettes can yield levels of tar, nicotine and carbon monoxide that are much higher than the levels recorded on the sides of the packages.[65] In fact, in some cases, light cigarettes can yield levels that are even higher than some regular cigarettes. Switching to light cigarettes, then, is unlikely to substantially reduce the risk of disease and may in fact increase the risk if smokers smoke

more or put off quitting because they believe that light cigarettes are safer.[1,66]

Tar, nicotine and carbon monoxide values are based on measurements taken by a smoking machine. But researchers have learned that smoking machines do not accurately represent the way that people smoke. Smoking machines test cigarettes by taking periodic puffs (usually one per minute) and puffing for a specified duration (for example, two seconds). This process is continued until a predetermined butt length is reached. But people are highly individual in their smoking behaviour, and studies show that many people inhale more deeply or more often than a machine.[1,67]

Smoking machine yields are also lower because light cigarettes have tiny air holes cut into the filter, which allow air to enter the filter and dilute the smoke. These holes, however, are often covered up by the smoker's fingers or lips, yielding much higher amounts of toxins.[1]

The production of low machine-measured yields of tar and nicotine did not necessarily mean that smokers were being exposed to lower levels of tar, nicotine and other compounds in tobacco smoke. In fact, smokers who were heavily addicted actively changed the way they smoked individual cigarettes. For example, some smokers increase the number of cigarettes they smoked per day or block the ventilation holes on the filters of the cigarettes to preserve the moment-to-moment and daily intake of nicotine.[1]

The way in which a cigarette is smoked is one of the most important factors in determining actual exposure to tar, nicotine and carbon monoxide.[1]

The 2002 Canadian Tobacco Use Monitoring Survey (CTUMS) estimated that 39% of Canadian smokers smoke light or mild, 39% smoke regular, and 22% smoke ultra-light, extra-light or extra-mild cigarettes. Overall, more Canadian men and women smoke light or mild or regular cigarettes than smoke ultra-light, extra-light or extra-mild cigarettes.[68]

For Alberta, the 2002 CTUMS estimated that 37% of current smokers smoke light or mild cigarettes, 43% smoke regular, and 20% smoke ultra-light, extra-light or extra-mild cigarettes. About 5% more women smoke ultra-light, extra-light or extra-mild cigarettes as compared to males in the province.[68]

Low-tar cigarettes were introduced in the 1950s and 60s following reports of tobacco-related cancer. In subsequent years, more and more people turned to light and ultra-light cigarettes (in 1954, the average smoke yields for American cigarettes were 38 mg tar and 2.7 mg nicotine; in 1993, they were 12 mg and 0.9 mg, respectively). If the so-called "light" cigarettes are indeed healthier, one might expect to see a proportionate decline of tobacco-related diseases and mortality rates, but this has not been the case.[1,66]

"Light" is a term having no set meaning when it comes to cigarettes. Light cigarettes are only "light" in relation to other cigarettes within a particular brand family; one brand's "light" might be another brand's "regular."[1]

A smoker who switches to light cigarettes will still crave the same amount of nicotine and will probably inhale more deeply or more often to get it. Researchers call this "compensatory smoking" and studies show that it is common.[1]

A cigarette that is labelled as yielding 6 mg of tar can actually yield four times as much if it is smoked intensely.[1]

Cigars and Pipes

Switching to cigars or pipes is not a safe alternative.

The risk of oral cancer increases with both the depth of inhalation and the number of cigars smoked per day.[69] Cancer of the oral cavity

includes cancers of the lip, tongue, cheek, gums, roof and floor of the mouth, and larynx (voice box). The risk for these cancers is as high for daily cigar smokers as it is for cigarette smokers.[70]

Smokers who switch from cigarettes to cigars tend to inhale more than cigar smokers who have never smoked cigarettes.[70] Risk for lung cancer, COPD (chronic obstructive pulmonary disease) and coronary heart disease remains high for cigar smokers who inhale.[71] In fact, cigar smokers are seven to 10 times more likely to develop oral cancer than non-smokers.[69] Former cigar smokers have a lower risk of oral cancer than current smokers.[72]

All cigar and pipe smokers, even those who do not inhale, are at increased risk for oral cancer and cancer of the larynx and esophagus, compared to those who do not smoke. [70-73]

Cigar smoke is at least as toxic as cigarette smoke, and a large, premium cigar is estimated to produce as much smoke as 15 to 20 cigarettes.[70]

As observed for cigarettes and cigars, quitting pipe smoking leads to a reduction in risk of oral cancer compared to continuing to smoke.[73]

Summary

Cigarettes have changed dramatically over the past 50 years; however, the disease risk associated with smoking has not.[1] Tobacco use is considered the single most significant cause of preventable illness, disability and death in Canada and in most other developed countries.[2]

Smoking causes lung cancer and cancers of the mouth, pharynx (throat), larynx (voice box) and esophagus and is a contributing cause of cancers of the bladder, kidney, and pancreas. In 1998 about 18,347 Canadians and 2,591 individuals in the prairie provinces died from tobacco-related cancers.[9]

Besides causing cancer, smoking is linked to causing respiratory disease, heart disease and many other health problems. About 10,618 Canadians and 1,714 individuals in the prairie provinces died from respiratory diseases in 1998.[9] In addition, 17,413 Canadians and 3,170 individuals in the prairie provinces died from cardiovascular diseases in 1998.[9]

Growing evidence links smoking to a wide range of other health problems,[35-38] such as cataracts, hormone-related problems, thyroid disease and tooth and gum disease. These are just a few examples.

Switching to "light" or "mild" cigarettes[64] or cigars and pipes[69-73] does not lower the risk of tobacco-related disease. Instead, cessation and reduction efforts can assist smokers in lowering their risk of tobacco-related diseases.

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HEALTH CONSEQUENCES OF SPIT TOBACCO

Quick Facts

- 8% of Alberta youth in grades 7 to 12 used chewing tobacco or snuff at least once in the last 12 months.[1,2]
- 15% of Alberta male youth (in grades 7 to 12) reported using chewing tobacco at least once in the past 12 months, compared to 2.5% of female youth in the province.[1,2]
- Many people start using spit tobacco very young (approximately nine or 10 years old).[3-5]
- With over 3,000 chemicals,[6] including 28 known carcinogens (cancer-causing agents), spit tobacco is a harmful tobacco product.[4]
- AADAC discourages the use of spit tobacco among Albertans, as it is not a safe product.[7]
- Spit tobacco causes oral cancer.[6, 8] About 35% of Canadians diagnosed with oral cancer will likely die within five years of diagnosis.[9]
- Spit tobacco increases the risk of cancers of the pharynx (throat), larynx (voice box), and esophagus.[6, 8]
- Spit tobacco use causes leukoplakia (mouth sores that can become cancerous), tooth abrasion, and gum recession.[10]
- Spit tobacco affects the cardiovascular system and may be associated with heart disease, stroke and high blood pressure.[11]

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HEALTH CONSEQUENCES OF SPIT TOBACCO

Spit tobacco use is a significant part of the overall world tobacco problem. Much of the tobacco in the world is consumed without burning. Rather, it is placed in contact with mucous membranes in the mouth or nose, through which nicotine is absorbed into the body. The use of nasal snuff, popular in the last century, is returning. Other forms of snuff, loose or packeted, are taken orally by placing the snuff in the mouth. Tobacco is also prepared in blocks and flakes for chewing. In the West, especially in the U.S. and Scandinavia, spit tobacco use consists of the oral use of snuff (moist or dry). In Central, South and Southeast Asia, spit tobacco is mostly consumed with a mixture of other ingredients. For example, tobacco is usually chewed together with another product, such as betel quid, ash, lime, cotton or sesame.[1-3]

What Is Spit Tobacco?

Spit tobacco comes in two basic forms: snuff and chewing tobacco.

Snuff is finely ground tobacco in a powder form that is sold in small tins and may be either moist or dry. Dry snuff can be inhaled, but the more common form is moist snuff, which is held between the cheek and gum. Just a pinch of snuff is all that is needed to release the nicotine, which is quickly absorbed into the blood stream.[4]

Chewing tobacco is coarser than snuff and exists in three forms: loose leaf (sold in a soft package or pouch), plug (sold in a small block or brick form) and twist (dried tobacco leaves that are twisted into strands). Users chew the tobacco for several hours to get a continuous high from the nicotine in the tobacco.[4]

The nicotine content in spit tobacco varies widely from product to product, and absorption can vary with the amount and length of delivery, and with the pH levels of the product and the user's mouth.[5,6]

The amount of nicotine absorbed through spit tobacco is two to three times the amount delivered by a cigarette. A person who consumes eight to 10 dips or chews per day receives the same amount of nicotine as a heavy smoker who smokes 30 to 40 cigarettes per day.[7]

Prevalence of Spit Tobacco Use

The extent of spit tobacco use in Canada and Alberta, although not extensively studied and documented, has been reported in several studies. Many of the studies are from the 1980s and 1990s.

The use of spit tobacco is increasing in North America,[5, 9] and is more prevalent on the prairies than in the rest of Canada. Both Alberta (1.4%) and Saskatchewan (2.0%) have considerably higher prevalence of spit tobacco use than any other province (all other provinces are at about 0.5%).[10] These 1999 statistics are reflective of current statistics given that the prevalence rates are relatively low.

Studies show that spit tobacco use is higher in certain pockets: among athletes, Aboriginal people, and males.[11, 12]

The Alberta Youth Experience Survey 2002, an AADAC survey, asked Alberta youth (grades 7 to 12) about their use of chewing tobacco or snuff. The study found that, particularly in high school, more male than female youths use chewing tobacco or snuff in Alberta. The following results were obtained from this survey:[13, 14]

- 8% of Alberta youth used chewing tobacco or snuff at least once in the past 12 months, higher than Nova Scotia (5%), the only other Canadian school survey measuring chewing tobacco use.
- 15% of Alberta male youth reported using chewing tobacco at least once in the past 12 months, compared to 3% of female youth in the province.
- Grade 11 youth reported the highest percentage of use of chewing tobacco or snuff (15%) followed by Grade 12 youth (10%) and Grade 10 youth (8%).
- 32% of Aboriginal youth reported having used chewing tobacco at least once in the last 12 months, compared to 7% of non-Aboriginal youth.
- Central Alberta (13%) and Calgary (9%) showed the highest youth use of chewing tobacco; youth in the north reported the lowest use (5%).

Most people who use spit tobacco start very young, putting them at increased risk for premature death.

Some studies have shown that spit tobacco initiation starts early, usually around age nine or 10.[7, 16, 22] For example, a 1992 Calgary study found that the average age of initiation of spit tobacco use was just over nine years.[16]

This early initiation age means that there is opportunity for sustained exposure. People who start to use spit tobacco when they are nine will have had over 20 years of exposure by the time they are 30, and over 30 years by the time they are 40. Given the strong risk factor for cancer and the relationship between the onset of cancer and duration of tobacco use, early initiation is a serious public health issue.[7]

Hoover, McDermott and Hartfield (1990) reported on a survey of 1,170 Canadian Aboriginal children in northern Saskatchewan. Thirty per cent of these children used spit tobacco, and half of them had started before the age of 12.[7]

A longitudinal study in Calgary found that the use of smokeless tobacco by students in grades 6, 7 and 8 increased from 1.1% in 1988 to 4.2% in 1990.[7]

During the past two decades, the consumption of oral snuff in the United States has increased by 64%, whereas consumption of other tobacco products has greatly decreased, namely 33% in the case of cigarettes and 52% in the case of chewing tobaccos.[7]

A major reason for the increased use of moist snuff is the growing prevalence of snuff dipping among male adolescents, aged 12 to 18 years, and among young adult males.[7]

The rise in prevalence and the early initiation of spit tobacco use are especially troubling in light of the serious health consequences of spit tobacco use.

Addiction and Spit Tobacco

It has been recognized since the 1980s that snuff, along with other oral tobacco products is addictive and causes cancer and other oral diseases.[20]

Both chewing tobacco and snuff are addictive because both contain nicotine.[24]

Most cigarettes have an average of 8.4 mg of nicotine per cigarette. But one dose of moist snuff has an average of 14.5 mg of nicotine, and one dose of chewing tobacco can have as much as 133 mg of nicotine.[2]

People who are addicted to spit tobacco often use it for many years, and this can lead to serious health problems.

Health Effects of Spit Tobacco

Several carcinogens have been identified in spit tobacco, the tobacco-specific N-nitrosamines (TSNAs), N-nitrosonornicotine (NNN), and 4(methylnitrosamino)-1-3-pyridyl-1-butanone (NNK) being the most important.[24]

The most harmful carcinogens in spit tobacco are the tobacco-specific nitrosamines (TSNAs), which are formed from nicotine. NNN and NNK are formed from nicotine during the curing, fermenting and aging process of tobacco production.[25,26] Other cancer-causing substances in spit tobacco include formaldehyde, acetaldehyde, arsenic, nickel, cadmium and benzopyrene.[25]

The concentration of the highly carcinogenic TSNAs is higher in snuff than in other spit tobacco products.[24,26] According to several studies, the three leading snuff brands in the U.S. (which make up 92% of the U.S. market) contain far higher concentrations of nicotine and TSNA than the less popular brands. Thus, the leading U.S. snuff brands have a high level of carcinogenic potential.[24]

A number of serious health problems can result from using spit tobacco:[1,7,21,27]

- **cancer of the mouth** (including the lip, tongue, inner cheek, and floor and roof of the mouth) and throat
- **leukoplakia** — a white, leathery, pre-cancerous patch that may develop where tobacco is held in the mouth, such as the cheeks, gums or tongue, and may become cancerous
- **gum and tooth disease**, including cavities, lost teeth and painful sores

- **gum recession** (where the gum pulls away from the teeth), loss of bone in the jaw, tooth abrasion (worn spots on the teeth), yellowing of teeth and chronic bad breath

Spit tobacco also affects the cardiovascular system and may be associated with heart disease, high blood pressure and stroke. Use of spit tobacco does not improve, and may in fact decrease, athletic performance. Spit tobacco users are also more likely than other people to adopt other behaviours that damage their health.

Cancer

Spit tobacco causes oral cancer, and increases the risk of cancers of the pharynx, larynx and esophagus.[23, 27]

People who use chewing tobacco and snuff experience an increased risk of oral cancer.[1, 23] The National Cancer Institute has estimated that in 2003 there will be 245 new cases and 90 deaths from oral cancer in Alberta. For Canada,[3] 100 new cases and 1,100 deaths from oral cancer are estimated for 2003. About 35% of new cases in Canada are fatal within five years of diagnosis.[28]

For both genders combined, cancer of the mouth and pharynx ranks sixth overall in the world. The mouth and pharynx are the third most common site among males in developing countries and fourth for females. The highest rates in the world for oral cancer are found in France, the Indian subcontinent, Brazil, and central/eastern Europe.[1]

Unlike smokers who experience widespread periodontal destruction, the most prevalent effects of spit tobacco are localized to the site where the spit tobacco product is placed.[29]

Surgery to treat oral cancer is often extensive and disfiguring and may involve removing parts of the face, tongue, cheek or lip.[30]

Mounting evidence also suggests that spit tobacco use may be associated with cancer of the pancreas.

A study by Severson (1993) found that two thirds of regular daily spit tobacco users had health problems that could be directly attributed to their use of moist snuff. These symptoms included sore, bleeding and receding gums, oral lesions, and upset stomach.

Oral Damage

Spit tobacco also causes leukoplakia, tooth abrasion and gum recession[29] and causes a multitude of problems inside the mouth.

Spit tobacco, whether chewed or sniffed, can lead mainly to inflammation of the oral cavity and oral cancers.[31]

Users can develop mouth sores (leukoplakia) that can become cancerous. As well, the grit and sand in spit tobacco products can scratch the teeth and wear away tooth enamel. A user's gums can also recede, especially in the spot where the tobacco is usually placed.The injured gums pull away from the teeth, exposing root surfaces, leaving teeth sensitive to heat and cold. This kind of damage is permanent.[29]

The risks of oral cancer and periodontal disease decline as time from cessation increases, and some oral mucosal lesions may resolve with cessation of spit tobacco use.[31]

Cardiovascular Diseases

Spit tobacco affects the cardiovascular system and may be associated with heart disease, stroke and high blood pressure.[24]

Like cigarettes, spit tobacco contains nicotine, and nicotine affects the heart. It is not surprising, then, that studies have found that spit tobacco may put users at increased risk for stroke, coronary heart disease, and peripheral vascular disease (that is, diseases of the arteries and veins.)[23]

Because of the pharmacological (drug) properties of nicotine and other chemicals found in spit tobacco, there is also concern that spit tobacco products may lead to cardiovascular diseases. Further rigorous studies are needed to determine more clearly the cardiovascular and non-oral cancer risks potentially associated with spit tobacco use.[24, 35]

Other Health-Related Effects

Effect on Athletic Performance

The high level of spit tobacco use among athletes is alarming. A 1997 U.S. study of student-athletes estimated that 23% of college male and female athletes in the United States reported using smokeless tobacco, including both chewing tobacco and snuff.[22]

The 1997 Youth Risk Behavior Survey (YRBS) done in the U.S. showed that both female and male athletes were more likely to have used smokeless tobacco, the effect being stronger for more highly involved athletes of both genders.[30]

However, research indicates that spit tobacco use does not improve[37, 38] and may in fact decrease athletic performance.[39] In a survey of 754 Canadian university athletes, 25% of males reported that they used spit tobacco. Sports that had a high incidence of spit tobacco use included soccer (22%), football (36%), and hockey (47%).[41] Some athletes believe that tobacco enhances performance, but studies that examine the effects of spit tobacco on reaction time in athletes do not show any improvement in performance.[23]

Increased Risk Behaviours

Numerous studies have shown that youth that use cigarettes or spit tobacco are also more likely to engage in other unhealthy behaviour(s), compared to non-users.[42] These risk behaviours include engaging in the use of other substances (e.g. alcohol and illicit drugs) and sexual risk behaviours.[42]

In addition, youth using spit tobacco products appear to be in more psychological distress than non-users, reporting more depression, attempts at suicide, and stress.[43]

Among students who reported using two or more tobacco products, risk behaviours are especially pronounced.[11] One study compared students who used both cigarettes and spit tobacco, students who used neither, and students who used only cigarettes or only spit tobacco. Students who used both cigarettes and spit tobacco had the highest likelihood of having ever used cocaine and other illicit substances, of being current users of alcohol, and of being current binge drinkers.[11]

Spit Tobacco and Harm Reduction

Analysis reveals that spit tobacco contains over 3,000 chemicals,[25] including 28 known carcinogens (cancer-causing compounds)[7] with well-established links to a range of adverse heath effects. Some tobacco control strategists nonetheless believe that encouraging a shift toward spit tobacco use can be an effective harm reduction approach on the basis that these products may reduce total tobacco-caused death and disease despite exposing users to potentially harmful constituents.[45]

The World Health Organization's Scientific Advisory Committee on Tobacco Products Regulation raises a cautionary note in this regard. In the Committee's assessment, current evidence does not indicate that use of any smokeless tobacco is free of health risks. They conclude that no health claims can be made.[46]

In addition, the literature does not provide evidence of a clear directional effect for shifting use among tobacco products (e.g., cigarettes and spit tobacco). Whereas some studies found that spit tobacco use is more likely to precede smoking,[18,47] others indicate that smoking is more likely to precede spit tobacco use.[48]

Although some people may use snuff to quit smoking, a study found that U.S. men more commonly switch from snuff use to smoking. There is evidence that snuff may serve as a supplemental source of nicotine dosing for some current male smokers. Nearly one half of men who used snuff on some days were current smokers, and those who currently smoked only on some days were more likely than never smokers to be current snuff users. Male smokers who used snuff every day smoked, on average, fewer cigarettes per day, again suggesting that snuff may have served as a supplementary source of nicotine dosing. Also, smokers who also use snuff are more likely than non-users to try to quit smoking but tend to be less successful.[18]

Given these uncertainties, other strategists take the view that, regardless of the specific levels of harm caused by spit tobacco products,

As a specific strategy, the term "harm reduction" generally refers to only those policies and programs which aim at reducing drug-related harm *without requiring abstention from drug use.*[17]

their overall inherent risks do not support spit tobacco as a viable harm reduction strategy. The major concern about promoting one tobacco product as less harmful than another is that it may undermine efforts to achieve total tobacco-product cessation or foster smoking initiation among people who otherwise would not have started.[18]

In weighing the available evidence, AADAC endorses the latter view, taking the position that because of inherent risks spit tobacco is considered to be an unsafe product and, therefore, it will not be used as a harm reduction strategy in Alberta.[19]

Spit Tobacco Cessation

Therapies and programs for spit cessation have generally been adapted from successful smoking cessation methods; however, some of the challenges that spit tobacco cessation poses are unique and should be considered in any quit attempt. Some of these challenges are[32]

- the presence of oral lesions which can be irritated by nicotine gum (estimates suggest that over 50% of users have some level of oral lesion)
- a strong need for an oral substitute during withdrawal
- the perception that spit tobacco is not a harmful tobacco product (users sometimes have less motivation to quit as a result)
- difficulty "fading" nicotine because dosages of spit tobacco are individual in amount and length of delivery ("fading" is the gradual and controlled reduction of nicotine intake)
- dual addictions: two levels of intervention may be necessary as many spit tobacco users are smokers as well

Smokers and spit tobacco users appear similar on a number of key factors associated with cessation. They report essentially equivalent levels of nicotine exposure, nicotine dependence, craving, and difficulty in stopping tobacco use.[20]

Recent evidence also suggests that spit tobacco users and smokers may experience similar levels of withdrawal severity upon quitting,[31] and, as with smokers, the majority of spit tobacco users want to quit but are generally unsuccessful in their attempts to do so.[20] Several U.S. studies have reported that over 50% of spit tobacco users would like to quit.[32]

Spit tobacco cessation methods should target specific populations to ensure greater success.[5] These are some possible target groups:

1. Male youth and young adults

- Spit tobacco use appears to be an important predictor of smoking initiation among young male adults.[11,14,47,48]

2. Athletes (both male and female) in sports such as hockey, soccer, and baseball

- Although there are mostly males who consume spit tobacco products, more women are participating in sports at all levels. Thus, health professionals need to enhance their awareness of emerging issues in women's oral health, with specific emphasis on female athletes, particularly with the use of spit tobacco.[32]

3. Youth using one or more tobacco products

- This pattern of use is a predictor of risky behaviours. Thus, programs designed to prevent tobacco use should consider that such use often occurs in association with other health-risk behaviours.[32]

4. Aboriginal populations

- The incidence of Aboriginal youth having tried chewing tobacco is much greater than that of the general population.[13, 14]

(Refer to the chapter "Cessation of Tobacco Use" for more information about cessation methods.)

Summary

Spit tobacco use is a significant part of the overall world tobacco problem. Much of the tobacco in the world is consumed without combustion (without burning). Rather, it is placed in contact with mucous membranes in the mouth or nose, through which nicotine is absorbed into the body.[1-3]

The Alberta Youth Experience Survey 2002, an AADAC survey, asked Alberta youth (grades 7 through 12) about their use of chewing tobacco or snuff. The study found that, particularly in high school, more male than female youth use chewing tobacco or snuff in Alberta.[13,14]

A number of studies have indicated that initiation of spit tobacco use occurs young (ages 9 or 10). This early initiation age means that there is opportunity for sustained exposure to the negative health effects of spit tobacco use. Thus, early initiation is a serious public health issue.[7]

With over 3,000 chemicals,[25] including 28 known carcinogens (cancer-causing agents),[7] spit tobacco is a harmful tobacco product. In weighing the available evidence, AADAC endorses the position that because of inherent risks spit tobacco is considered to be an unsafe product and, therefore, it will not be promoted as a harm reduction strategy in Alberta.[29]

A number of serious health problems can result from using spit tobacco:[4, 7, 23, 27]

- cancer of the mouth (including the lip, tongue, inner cheek, and floor and roof of the mouth) and throat
- lenkoplakia (a white, leathery, pre-cancerous patch that may develop where tobacco is held in the mouth, such as the cheeks, gums or tongue, and may become cancerous)
- gum and tooth disease, including cavities, lost teeth and painful sores
- gum recession (where the gum pulls away from the teeth), loss of bone in the jaw, tooth abrasion (worn spots on the teeth), yellowing of teeth and chronic bad breath

Spit tobacco also affects the cardiovascular system and may be associated with heart disease, high blood pressure and stroke. Use of spit tobacco does not improve, and may in fact decrease, athletic performance. Spit tobacco users are also more likely than other people to adopt other behaviours that damage their health.

Spit tobacco cessation methods should target specific populations to ensure greater success, such as male youth and young adults, athletes (both male and female), youth using one or more tobacco products, and Aboriginal populations.

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ENVIRONMENTAL TOBACCO SMOKE (ETS)

Quick Facts

- Environmental tobacco smoke (ETS) (also referred to as "second-hand smoke" or "passive smoking") contains at least 50 known cancer-causing chemicals, and these chemicals are inhaled and absorbed by non-smokers and smokers.[1]
- Traces of carcinogens and other toxins are found in the blood, urine, saliva and breast milk of non-smokers, even after limited exposure.[2]
- Prolonged ETS exposure can cause lung cancer in non-smoking adults.[3]
- About 347 non-smokers die each year in Canada from ETS-related lung cancer.[3]
- ETS causes ischemic (coronary) heart disease in non-smokers.[4]
- Adult non-smokers living with smokers increase their risk of heart disease by about 25%.[5]
- Estimates in 1997 indicate that 803 Canadians and 56 Albertans died from coronary heart disease as a result of exposure to ETS.[4]
- ETS causes diseases of the lower respiratory tract, respiratory irritation, middle ear disease and worsened asthma in children.[6-10]

- 19% of Alberta children under the age of 12, and 27% of Alberta youth between 12 and 17 years, are regularly exposed to ETS in their homes.[11]
- 78% of Albertans are exposed to second-hand smoke in public places such as restaurants, bars, shopping malls, arenas, bingo halls and bowling alleys.[12]

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ENVIRONMENTAL TOBACCO SMOKE (ETS)

Environmental tobacco smoke (ETS), also referred to as second-hand smoke or passive smoking, is an important issue in tobacco control. ETS is associated with adverse health effects, and it increases the risk of several diseases. The risk of disease as a result of smoking is not limited to smokers. In fact, non-smokers are also at risk.

The overwhelming body of medical evidence, contained in hundreds of scientific studies and six internationally recognized comprehensive reviews undertaken during the last decade, clearly demonstrates the direct causes and linkages between exposure to second-hand smoke and serious health effects among non-smokers.[1]

The AADAC 2003 Public Opinion Survey reveals that 73% of adult Albertans strongly agreed that second-hand smoke poses a real and serious threat to the health of non-smokers, particularly children, who are exposed to it.[2]

This section explores the basics of ETS: what it is and why it is a public health problem for Albertans and other Canadians.

Components of ETS

ETS is made up of the smoke that comes from the burning tips of a cigarette, pipe or cigar (called sidestream smoke) and the smoke that is exhaled from the smoker (called mainstream smoke). Sidestream smoke makes up most of ETS, about 85% in fact. Sidestream smoke has a different chemical composition from mainstream smoke because it is generated at lower burning temperatures, and the combustion (burning) is not as clean or complete.[3]

Scientists have determined that sidestream smoke has more carcinogens (cancer-causing agents) than mainstream smoke and that it causes more skin tumours in mice than mainstream smoke.[4] (Mouse skin studies are commonly used in this field to determine cancer-causing potential.)

Why Is ETS of Concern to Our Health?

ETS contains at least 50 known cancer-causing chemicals.

In 1992, the U.S. Environmental Protection Agency declared ETS a Class A carcinogen (which means that ETS causes cancer in humans). The study concluded that 50 of the 4,000 chemicals in ETS are known to cause cancer. In addition, some of the carcinogens in ETS were found to have no known safe level of exposure.[5]

These chemicals are known to be inhaled and absorbed by non-smokers.

Two thirds of the smoke from a burning cigarette is not inhaled by the smoker but is released into the surrounding environment.[6]

Second-hand smoke has twice as much nicotine and tar as the smoke that smokers inhale. It also has five times as much carbon monoxide as the smoke that smokers inhale (carbon monoxide decreases the amount of oxygen the blood can carry to the tissues).[7]

Research has shown that non-smokers absorb some of the toxic chemicals and carcinogens from ETS. Researchers have found traces of these toxins in the blood, urine, saliva and breast milk of non-smokers, even after limited exposure.[8]

An article by Anderson, Carmella, Ye, Bliss, Le, Murphy and Hecht (2001) reported that spouses who live with smokers have five to six times greater exposure levels to known human carcinogens than spouses who do not live with smokers.[7] Other family members are also affected by the environmental tobacco smoke produced by smokers in their households. Non-smokers exposed to ETS may experience short-term symptoms such as eye irritation, nasal symptoms, sore throat, and hoarseness. However, many smokers and non-smokers may not be aware of the more serious, long-term health effects of ETS exposure, including the risk of increased morbidity and mortality from lung cancer, heart disease, chronic lung disease and sudden infant death syndrome (SIDS).[9]

Health Effects of ETS

The health of smokers and non-smokers may be compromised by ETS as they breathe in both the sidestream and mainstream smoke.

People who are regularly exposed to ETS are at increased risk for developing health problems related to ETS.

The chemicals that are inhaled from ETS are not safe for humans. It is not surprising then that they can cause serious health problems or make existing health problems even worse.

In Canada, second-hand smoke exposure causes between 1,100 and 7,800 deaths per year.[9]

In the 1990s, six major scientific reviews[10-15] identified 15 diseases or conditions as known or suspected to be caused by exposure to second-hand smoke. These six comprehensive scientific reviews and hundreds of other studies concluded that second-hand smoke is a *direct cause of*

- lung cancer
- heart disease

- nasal sinus cancer
- a variety of respiratory conditions such as asthma, middle ear disease, bronchitis and pneumonia (particularly in children), and
- sudden infant death syndrome (SIDS)

In addition to these direct causal relationships, medical evidence suggests that several other diseases and/or conditions may be caused by second-hand smoke exposure. These conditions include stroke, spontaneous abortion, adverse impacts on cognition and behaviour in children, exacerbation of cystic fibrosis, cervical cancer, and breast cancer.[10-15]

ETS and Lung Cancer

ETS can cause fatal lung cancer in adult non-smokers.

Knowing that the cancer-causing agents in ETS are absorbed by non-smokers, and that there is no known safe level of exposure to these chemicals, we might expect ETS to cause cancer in non-smokers. And, indeed, studies have shown that prolonged ETS exposure during adulthood can lead to an increased risk of lung cancer. In Canada, an estimated 347 non-smokers die of ETS-related lung cancer each year.[20]

Understanding ETS and Lung Cancer

A 1998 study sponsored by the World Health Organization (WHO) established an association between ETS and lung cancer. An estimated 16% increased risk of lung cancer was found among non-smoking spouses of smokers, and a 17% increased risk of workplace exposure. The results of the study, according to the WHO are

> "consistent with the results of major scientific reviews of this question published during 1997 by the government of Australia, the U.S. Environmental Protection Agency and the State of California. From these and other previous reviews of the scientific evidence emerges a clear global scientific consensus — passive smoking does cause lung cancer and other diseases."[21, 22]

Building the Evidence

Support for the association between ETS and lung cancer in non-smokers is strengthened by the fact that it is based on several different kinds of evidence, including epidemiological, biological, dose-response and indirect estimates.[23] The association has been established by the following:[24]

- Over 15 years of international epidemiological studies have found an increased risk of lung cancer among lifelong non-smokers living with long-term smokers.

- Biological studies have confirmed that non-smokers inhale and metabolize the same carcinogens in tobacco smoke that cause lung cancer in active smokers, and that measures of tobacco smoke inhalation and known carcinogens are elevated in passive smokers.
- Studies have shown a dose-response relationship, indicating that the greater the amount and length of ETS exposure, the greater the associated risk.
- Calculations of increased risk in non-smokers based on extrapolations from the known risk in smokers are in keeping with findings from epidemiological and biological studies.

Further evidence has recently been brought forward by the International Agency for Research on Cancer (IARC) with a scientific working group of 29 experts. This panel reported in June of 2002 that second-hand smoke is carcinogenic to (that is, causes cancer in) humans.[25]

This scientific panel conducted meta-analyses of more than 50 international studies of exposure to second-hand smoke and lung cancer risk in non-smokers over the past 25 years. A statistically significant and consistent association was found between lung cancer risk among non-smokers exposed to second-hand smoke from active smokers, whether they were exposed to it by their spouses or in the workplace. Thus, this panel concluded, "involuntary smoking is a cause of lung cancer in never smokers."[25]

ETS and Heart Disease

There is increasing evidence that chronic exposure to ETS is also associated with an increased risk of coronary heart disease (CHD) in non-smokers. **This means that ETS is an important and avoidable cause of ischemic (coronary) heart disease in non-smokers**.[26]

Estimating the number of deaths that are associated with ETS is a complex task, since there are multiple settings of potential exposure including the home, workplace and public places. However, estimates can be made based on what we know about the exposure levels in specific environments, allowing us to highlight the disease burden from ETS.

It has been estimated in the United States that chronic exposure to second-hand smoke causes 10 times as many deaths from heart and blood vessel diseases as it does from lung cancer.[27]

A 2002 report by Health Canada estimated that in 1997, 803 Canadians (56 from Alberta) died from coronary heart disease as a result of involuntary tobacco smoke exposure. This estimate was based on ETS exposure in the home only and excluded workplace exposure.[28]

A study by Pitsavos, Panagiotakos and Chrysohoou (2002) surveying 847 individuals who experienced acute coronary syndromes (indicative of coronary heart disease), found that non-smokers who were regularly exposed to second-hand smoke in the workplace and home (30 minutes or more each day) had a 47% greater risk of developing acute coronary syndromes than non-smokers who were not exposed to second-hand smoke. This study is not only consistent with other scientific evidence on increased coronary risk and second-hand smoke exposure, but supports the hypothesis that the risk of developing acute coronary syndrome is increased with exposure to second-hand smoke in the workplace and home.[28]

Tobacco smoke is a potentially deadly environmental exposure. To provide some perspective on the degree of complacency with which ETS is often treated, let's consider one example. Within workplaces, environmental exposure limits for specific toxins are often set to reflect the number of deaths that would likely occur as a result of exposure to the toxin.[29] These environmental limits are usually in the range of one death in 100,000 or one in a million. However, coronary heart disease deaths attributed to passive smoking are about four in 100,000 for Canada as a whole. This rate far exceeds what is acceptable for other toxic exposures in the workplace.[30]

Understanding ETS and Heart Disease

Many people are still unaware of the effects that ETS has on the heart and blood vessels, even though ETS causes 10 times more deaths from ischemic heart disease than from lung cancer.[27]

ETS contains at least five times more carbon monoxide than mainstream smoke, and carbon monoxide has immediate negative effects on the heart. So, while ETS causes lung cancer only after long and consistent exposure, ETS can affect the heart within 20 minutes of exposure.

Within 20 minutes to eight hours of exposure, ETS[27]

- increases the resting heart rate, blood pressure and blood carboxyhemoglobin (the compound formed by carbon monoxide and blood hemoglobin that causes carbon monoxide poisoning)
- increases the heart's need for oxygen while compromising its supply and decreasing its ability to process it efficiently
- can worsen the symptoms of angina in people with existing heart disease

With prolonged exposure, ETS

- increases the risk of coronary thrombosis (blood clots) and heart attack[29]
- may cause hardening, clogging and obstruction of arteries[27]

- increases the risk of heart disease by about 25% (this association is noted in non-smoking adults who live with smokers)[30]

ETS and Other Health Problems

ETS can make existing health problems worse.

ETS is a health hazard, not only for people who live with it day to day, but also for people who are exposed to it only occasionally (for instance, in restaurants or bars) and for short periods of time.

ETS can affect a non-smoker's lungs, throat and eyes.

ETS affects the respiratory health of non-smokers and can cause reduced lung function, increased coughing, phlegm production and chest discomfort.[3] It can also cause eye irritation, sore throat and nausea in non-smokers.

ETS and Health Effects Among Children

Children are particularly vulnerable to ETS because their lungs are still growing and developing.

Children breathe at a quicker rate than adults, taking in more air (relative to their body weight), and therefore more pollutants, than adults.[31] In the 1992 landmark report by the Royal College of Physicians in Britain, it was reported that children of smoking parents inhale the same amount of nicotine as if they themselves smoked 60 to 150 cigarettes a year.[31]

In 2000, 25% of the 2.4 million Canadian households with children under the age of 12 reported regular exposure of these children to ETS in the home from cigarettes, cigars or pipes.[32] This means that approximately 900,000 children under the age of 12 are regularly exposed to ETS while in the home. Considering that an additional 760,000 children between the ages of 12 and 17 are also regularly exposed to tobacco smoke while at home, over 1.6 million children under the age of 18 have increased health risks and higher risk of taking up smoking.[33]

According to the 2000/2001 Canadian Community Health Survey (CCHS), 19% of Alberta children under the age of 12 and 27% of those between the ages of 12 and 17 were regularly exposed to ETS in their home. These results were the same for Canadian children.[34]

Of those homes where smoking was permitted, about half of them (47%) reported a variety of restrictions intended to limit children's exposure to ETS. However, the other half (53%) reported no restrictions whatsoever.[35]

Children who are exposed to ETS in the home and/or car can develop diseases of the lower respiratory tract such as bronchitis and pneumonia.[37-39]

The number of cigarettes smoked indoors is a major determinant of the level of risk to a child's health. In those homes with children under the age of 12 where smoking occurs, 47% reported a daily indoor consumption of one to 10 cigarettes; 25% reported a daily consumption of more than 21 cigarettes. Where second-hand smoke exposure was reported, children under the age of 12 were exposed to slightly more than 12 cigarettes per day, on average.[35]

The number of smokers who smoke indoors also influences the level of health risk from ETS exposure at home. In about half of homes with young children (children under the age of 12) exposed to tobacco smoke, only one person smoked regularly indoors. However, over a third (34%) of homes with young children exposed to tobacco smoke had two indoor smokers, and 10% had three or more smokers.[35]

Children with at least one smoking parent have a 25 to 40% increased risk of chronic respiratory symptoms such as cough, wheeze, breathlessness, and phlegm compared to children not exposed to ETS at home.[40]

In addition, young children of parents who smoke are twice as likely to suffer from serious respiratory infection requiring hospitalization.[41] Fifteen to 23% of hospitalizations for lower respiratory illnesses in young children are due to ETS exposure. Each year in Canada, an estimated 13 to 20 children die from lower respiratory infections.[42]

ETS also causes other respiratory conditions, including coughs, colds, tonsillitis and adenoid problems.[3] About 16% of all physician visits for coughs, 24% of all tonsillectomies and adenoidectomies, and 20% of all lung infections in children under the age of five are attributable to ETS.[42] In 1997, Cook and Strachan[38] estimated that this amounts to about

- 43,600 cases of bronchitis
- 19,000 cases of pneumonia
- 200,000 physician visits for coughs
- 2,100 tonsillectomies/adenoidectomies

ETS can cause middle ear disease (including acute otitis media) in children.[3]

Commonly known as fluid in the middle ear, middle ear disease affects up to 46% of children by the age of three years.[43] It is the most common reason for surgery in young children, resulting in 16,500 tympanostomies (ear tube operations) in Canada each year.

ETS is estimated to be responsible for as many as 13% of all cases of middle ear disease in pre-schoolers in Canada, or about 220,000 cases each year.[32]

ETS makes existing asthma worse and may contribute to the onset of asthma.[3,44]

According to a landmark British study, symptoms of asthma are twice as common in the children of smokers.[33] ETS is also known to cause over a 10% increased risk of developing asthma in children ages six to 18 years who have a smoking parent, as well as worsen existing asthma by increasing the number and frequency of asthma attacks.[45, 46]

In Canada, about 52,000 visits to the doctor for aggravated asthma in children are caused by ETS.[32] Between 8% and 13% of all new cases of asthma are now thought to be caused by ETS.[32]

Infants who were regularly exposed to ETS before birth are at increased risk of sudden infant death syndrome.[47]

The risk of sudden infant death syndrome (SIDS) is two to three times higher when a woman smokes during pregnancy.[47]

Infants are also at increased risk for SIDS if other people in the household smoke, even if the mother is a non-smoker.[47] It is estimated that more than one third of SIDS deaths are due to maternal tobacco use.[48]

ETS is a harmful indoor air pollutant and has serious health consequences, not only for children, who are limited in their ability to remove themselves from the problem. Since even short exposure negatively affects the human body, reducing indoor ETS is essential to public health.

Canadian children who are exposed to ETS probably receive a greater degree of exposure than would children from warmer climates. Our winters are cold, so our houses are tightly insulated, trapping pollutants indoors. And Canadian children are likely to spend more time indoors during the winter months than would children in warmer climates.

In a regional study of childhood asthma conducted in Red Deer and Medicine Hat, University of Alberta researchers found that 46% of children with asthma had a parent who smoked. The study also found that 40% of adults with asthma were exposed to ETS on a daily basis.[49]

ETS and the Workplace

ETS is a problem for Albertans and Canadians, especially at home and at work.

Urban Canadians spend about 90% of their time indoors, both at home or at work.

The 2000/2001 Canadian Community Health Survey (CCHS) found that 30% of Albertans and 28% of Canadians said they are regularly exposed to second-hand smoke. Most Albertans (78%) said they are exposed to second-hand smoke in public places such as restaurants, bars, shopping malls, arenas, bingo halls and bowling alleys. Others also identified exposure to second-hand smoke in a car or other private vehicle (40%) and at home (36%).[50]

Alberta: In 1996, four prison guards brought claims before the Alberta Workers' Compensation Board (WCB), stating that work-related ETS had aggravated previously existing medical conditions. The WCB ruled in favour of the claims, thereby recognizing ETS as a workplace hazard.

In October of 2002, the Workplace Safety and Insurance Board awarded a settlement to Heather Crowe, an Ottawa waitress who did not smoke but developed lung cancer as a result of second-hand smoke in the workplace. A life-long non-smoker, Heather Crowe worked as a waitress in various restaurants and bars across the country for 40 years. In March of 2002, she discovered three lumps in the side of her neck, and a subsequent x-ray showed a large tumor in her chest. The diagnosis confirmed that Heather had lung cancer, because of her long exposure to second-hand smoke.[1]

Policies and Legislation

The goals of workplace smoking control policies are to protect non-smokers from the health hazards of environmental tobacco smoke and to help workers who smoke to quit.[32] Reducing occupational exposure to smoking should lead to improved employee health. This in turn means improved productivity of the organization, and lowers costs to employers from smoking-related problems such as accidents, damage to property and cleaning.[33]

All provinces in Canada control smoking under their jurisdiction to some extent, as a matter of policy, of law, or both. Each provincial and territorial jurisdiction in Canada has enacted ventilation requirements in the workplace through statutes and accompanying regulations. Provincial and territorial legislation reveals a nation-wide acceptance that an employer must ensure the workplace under his/her control is adequately ventilated. Alberta has included ventilation requirements in legislation and ETS workplace smoking legislation through the Ventilation Regulation under the Occupational Health and Safety Act.[34]

Also, since 1988 the federal Non-Smokers' Health Act has partially protected workers under the federal jurisdiction (about 8% of the workforce) from exposure to second-hand smoke in the workplace. Smokers are allowed only in enclosed rooms specifically designated for that purpose.[35]

A review on the effects of smoking restrictions in the workplace undertaken by Brownson, Hopkins and Wakefield (2002) found that workplace exposure to ETS is strongly influenced by the types of workplace and smoking policy. For example, blue-collar and service workers are more likely than other types of workers to be exposed to ETS in the workplace. Smokers who are employed in workplaces with smoking bans are likely to consume fewer cigarettes per day, are more likely to be considering quitting, and quit at a higher rate than do smokers employed in workplaces with no or weaker policies.[36]

Moher and Lancaster (2002) found that the main strategy for reducing environmental tobacco smoke involves restrictions or total

bans on smoking in workplaces. Successful implementation of such bans usually involves some form of support for workers who smoke (such as advice from a health professional, individual and group counselling, and pharmacological treatment to overcome addiction), and programs for smoking cessation may also be offered independently of a workplace policy.[37]

There are several options proposed to deal with workplace tobacco control:[38]

1. Ban all indoor and outdoor smoking (most effective and beneficial option: total ban combined with support for people who smoke).
2. Ban indoor smoking and outdoors within a specific distance from doors, windows and intake vents (three to nine metres as appropriate to the workplace facilities and design).
3. Restrict indoor smoking to designated, enclosed areas that are separately ventilated and directly exhausted to the outside. The ventilation should conform to standards that allow an air exchange rate of 30 litres per second per person. Designated smoking areas should be located in a non-work area that no one is required to enter as part of his or her responsibilities.

In the AADAC 2003 Public Opinion Survey, Albertans were asked to describe the level of smoking restrictions in their workplace:[2]

- 41% said that smoking was completely restricted in their workplace
- 48% said that smoking was allowed only in designated areas
- 11% said that smoking was not restricted at all in their workplace

Another AADAC study, Substance Use and Gambling in the Alberta Workplace, 2002: A Replication Study, provided current information on used substances, including tobacco, in the Alberta workplace. Study results revealed that in 2002[39,40]

- 50% of employers (362 of a total of 721 employers surveyed) indicated that they have formal policies on tobacco use in the workplace.
- Of those employers who said they do have formal policies on smoking, alcohol, drugs or gambling in their organization, 72% said that the provision of a smoke-free workplace is included in their organization's policies.
- 11% of employers indicated that tobacco use is not permitted on the worksite. However, just over half (53%) of employers reported permitting tobacco use on the premises. This occurred most often in industries with outdoor workers (forestry/mining,

construction, agriculture and upstream oil/gas) and in blue-collar occupations (primary occupations, construction, transportation, and materials handling and processing). It occurred least often in the public sector (hospitals/health care, education, social services and public administration) and in white-collar occupations (manager/professional, and clerical offices).

Ventilation Solutions

The American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), the world's leading ventilation standard-setting organization, sets standards and guidelines for ventilation rates. In Canada, the ASHRAE standards are the most widely observed code of ventilation practice.[31]

For dealing with tobacco smoke, ASHRAE recommends the reduction of "the concentration of all known contaminants of concern to some specified acceptable level." However, there is consensus amongst several scientific agencies — the U.S. Environmental Protection Agency, the World Health Organization, the American Medical Association, the American Lung Association, the National Institutes for Occupational Safety and Health (U.S.), the National Academy of Sciences, the Occupational Safety and Health Administration (U.S.) and the Surgeon General (U.S.) — that there should be no exposure to second-hand tobacco smoke.[31]

Searches for effective ventilation solutions have proven unsuccessful. A panel of 14 experts in ventilation technology recently concluded that existing dilution ventilation technology could not effectively remove much tobacco smoke from indoor air. As such, in revising its ventilation standards, ASHRAE no longer provides ventilation standards for air with tobacco smoke in it, only for air in smoke-free buildings.[31]

Smoking Bylaws

Bans on smoking in Canadian bars and restaurants have been operating for several years in many cities in British Columbia and in Waterloo, Ontario. As of August 2001, Ottawa has had an effective ban on smoking in all municipally regulated indoor workplaces and public places, including bars and restaurants.[31]

The AADAC 2003 Public Opinion Survey asked adult Albertans (N=3,000) to rate their level of agreement with the banning of smoking in various public places. Most respondents somewhat or strongly agreed that smoking should be banned in places frequented by all ages, but in particular in locations where children are present. Albertans are less likely to somewhat or strongly agree that smoking should be banned in places where only adults are allowed (that is, bingo halls,

casinos, bars and lounges). Smokers are much less supportive of banning smoking in adult-only locations than non-smokers are.[2]

Public Place	% of Somewhat or Strongly Agree
School zones	91
Places where children are allowed	88
Shopping malls	85
Workplaces	78
Restaurants	77
Bingo halls	57
Casinos	50
Bars and lounges	46

Source: AADAC. Alberta Alcohol and Drug Abuse Commission 2003 Public Opinion Survey. Edmonton, AB; April 2003.

There is considerable variation in the way municipal governments across Alberta have dealt with smoking in public places and workplaces. Proposed implementations of smoking bylaws in municipalities have stimulated much debate across the province.

The City of Ottawa implemented a 100% smoke-free workplace and public places bylaw, without provision for separately ventilated designated smoking rooms (DSRs). Compliance with this bylaw was high — about 95%. A recent study was conducted to determine the impact of this smoke-free bylaw on taxable sales of restaurants and bars in the city of Ottawa. The study found that there was no evidence that the Ottawa smoke-free bylaw adversely affected restaurant and bar sales.[3]

Summary

Environmental tobacco smoke (ETS) increases the risk of several diseases and is associated with other adverse health effects. The risk of disease as a result of smoking is not limited to smokers. In fact, non-smokers are also at risk.

Scientific reviews have identified 15 diseases or conditions as known or suspected to be caused by exposure to second-hand smoke. Chronic exposure to second-hand smoke is a *direct cause of* lung cancer, heart disease, nasal sinus cancer, a variety of respiratory conditions such as asthma, middle ear disease, bronchitis and pneumonia (particularly in children), and SIDS.[1,6,7]

Implementing legislation and policies, and providing smoking interventions are effective ways of reducing ETS exposure for both smokers and non-smokers.

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YOUTH AND SMOKING

Quick Facts

- 18% of Alberta teens (12 to 19 years old) smoked in 2001.[1]
- Young Albertans aged 20 to 24 years are most likely to be current smokers (smoking daily or occasionally), at 30%.[2]
- The highest proportion of occasional smokers (9%), in Alberta, are found among the young adults age 20 to 24 years.[2]
- 65% of Albertans who have ever smoked a cigarette said that they had smoked their first cigarette by age 16.[2]
- Typically, experimentation with smoking begins between the ages of 12 and 16.[2]
- Youth in Alberta get their cigarettes from both commercial sources (such as tobacco retailers, Internet vendors, and vending machines),[3-6] and non-commercial or social sources (such as parents, siblings and other family members, friends, acquaintances, and even strangers).[4]

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YOUTH AND SMOKING

The prevalence rates of smoking among Alberta and Canadian youth as well as the associated negative health consequences make tobacco use among youth a significant public health concern.

Prevalence of Youth Smoking

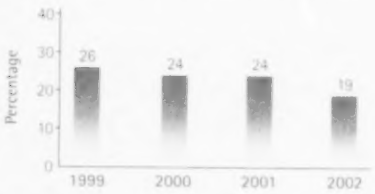
Young Canadians have a high prevalence of smoking, making them especially at risk of the health consequences of tobacco smoke.

While smoking rates in Canada have dropped over the past decade, rates among young Canadians substantially increased in the early 1990s and have since been slowly declining in recent years. The rate for Canadian teen smokers aged 12 to 19 climbed in the early 1990s, but has been slowly declining in the past few years to about 19% in 2001.[1]

According to the Canadian Community Health Survey (2000/2001), about 18% of Alberta teens (12 to 19 years old) smoked in 2001.[2]

Data from the Canadian Tobacco Use Monitoring Survey indicate that the smoking rates amongst Alberta teens (15 to 19 years) have generally been on the decline over the past four years, from 26% in 1999 to 19% in 2002.[3]

Alberta smoking rate, 15 to 19 years, 1999, 2000, 2001, 2002



Source: Statistics Canada. Canadian Tobacco Use Monitoring Survey 1999, 2000, 2001, 2002

The Alberta Youth Experience Survey 2002, an AADAC survey, found that the proportion of youth from grades 7 to 12 who have not smoked in the past 12 months is 84%. However, 16% of young Albertans continue to smoke daily or occasionally. In fact, 98% of Grade 7 Alberta youth surveyed said they did not smoke. However, this rate decreases to 41% by Grade 12. Also, from grades 7 to 12, more than twice the proportion of Aboriginal youth as non-Aboriginal youth reported that they have smoked in the past 12 months (37% and 16%, respectively).[3,4]

Smoking Initiation

The Alberta Youth Experience Survey 2002 asked youth from grades 7 to 12 in what grade they first started smoking; 60% of them started smoking between grades 6 and 8.[1,4]

According to the 2002 Canadian Tobacco Use Monitoring Survey (CTUMS), 65% of Albertans who have ever smoked a cigarette said that they had smoked their first cigarette by age 16. By age 18, 79% had tried their first cigarette. Typically, experimentation with smoking begins between the ages of 12 and 16.[2]

More than a third of current and former smokers began smoking before their 15th birthday.[3]

- The 2000/2001 Canadian Community Health Survey found that in Canada 38% of current and former smokers aged 12 and over began smoking before their 15th birthday. In fact, 8% of them began smoking between the ages of five and 11 years.[3]
- Overall, Canadian males were almost twice as likely as females to have smoked their first cigarette between ages five and 11 years.[3]
- Alberta had a 9% smoking initiation rate for ages five to 11 years.[3]
- Nunavut had the highest rate of smoking initiation for this age group at 19%, significantly higher than the Canadian average (8%).[3]

Young Canadians and Albertans 20 to 24 years old have higher smoking rates than any other age group.

- Young Canadian adults aged 20 to 24 still have the highest smoking rate of any age group, at 31%.[2] The smoking rate for Canadian males aged 20 to 24, which was 41% in 1985, decreased to 31% in 2002. In 1985, the rate for 20- to 24-year-old Canadian females was even higher than that for males, at 45%. However, by 2002 it decreased to 30%.[2,6]
- In Alberta we observe a similar trend. Thirty per cent of young Albertans aged 20 to 24 years smoke daily or occasionally, the highest rate of any age group. In addition, the highest proportion of occasional smokers (9%) are found among the young adults age 20 to 24 years.[2]

Data from the Canadian Campus Survey (2003) of 7,800 students from 16 universities across Canada found that overall, 17% of Canadian undergraduate students reported daily cigarette smoking and 10%

Few people begin smoking after the age of 20,[7] although a study of American college students suggests that this trend could be changing; the study found that 11% of college smokers had their first cigarette on or after 19 years of age, and 28% began smoking regularly on or after that age.[8]

reported occasional smoking. Rates of daily smoking differed significantly by[7]

- region (with rates above average among those attending university in the Atlantic provinces and below average among those attending university in British Columbia and the Prairies)
- residence (those residing off campus with family reported the highest prevalence rate)
- year of study (those in their final year typically reported lower rates)

Thus, university campuses represent an environment where potential gains can be made by tobacco control policies and initiatives.[7]

Health Consequences of Smoking Among Youth

Although the health consequences of smoking are a function of both the length of time and amount smoked, according to the 1994 U.S. Surgeon General report, adolescents who are regular smokers are at an increased risk for health problems during their adolescent and young adult years.[10]

Cigarette smoking during adolescence reduces the rate of lung growth, maximum lung function, and overall fitness levels of adolescents, as well as increases the risk of respiratory problems.[11]

(Refer to the chapters "Health Consequences of Smoking Cigarettes, Cigars and Pipes" and "Health Consequences of Spit Tobacco" for more information on the health effects of the use of tobacco products.)

Factors Associated with Youth Smoking

Youth tobacco use is influenced by many factors, whether physiological, social, cultural or personal, and is also influenced by the interaction between these factors.[12,13]

Physiological factors include individual physiological susceptibility to nicotine addiction, adverse and positive bodily responses to smoking, and other variables that result from genetic make-up and the physical environment.

Social influences include the characteristics, beliefs, attitudes, and behaviours of the people, such as family and friends, who make up the more intimate support systems of adolescents. Examples of social factors include[12,13]

- accessibility to tobacco products
- parental hostility, strictness and family conflict
- level of parental supervision, involvement, or attachment

- parental smoking
- sibling smoking
- peer smoking
- perceived peer attitudes toward smoking
- strength of attachment to peers
- socioeconomic status and parental education

Cultural influences include the practices and norms of the broader social environment of adolescents, such as the community, neighborhood and school. These include factors such as[12, 13]

- pricing of tobacco products
- advertising and promotion of tobacco products
- perceived norms and prevalence of smoking

Personal influences include individual biological characteristics, personality traits, affective states, and behavioural skills. These include factors such as[12, 13, 14, 15]

- sociability
- intelligence, academic performance, and commitment to school
- rebelliousness, risk-taking, and other health-related behaviours
- self-esteem
- emotional distress
- coping styles
- perceived refusal skills
- previous experimentation with tobacco and intention to smoke
- beliefs about effects on image and health
- concerns with weight control
- beliefs about mood control and depression

Youth Access to Cigarettes

In numerous surveys conducted since the late 1980s, youth often self-reported that their most common source of cigarettes was purchased from retail stores.[12, 16] Thus, much of the literature over the past two decades related to youth access to cigarettes focused on reducing sales to minors at retail outlets.[17, 18] Field research concerning minors' access generally concentrated on assessing rates of illegal sales of tobacco to minors from retail stores during compliance checks in which underage youth attempted to purchase tobacco products.[20] Compliance check studies in which both girls and boys participated generally found that retailers were more likely to sell cigarettes to girls than to boys of the same age.[12, 20]

This is, however, just one small piece of the puzzle. In developing a more comprehensive view of youth access, a range of sources and methods that youth use to obtain tobacco products might be considered. Providers of tobacco products include commercial sources (such as tobacco retailers, Internet vendors, and vending machines),[21,23] and non-commercial or social sources (such as parents, siblings and other family members, friends, acquaintances, and even strangers).[22] The ways in which youth obtain tobacco products might include purchasing, stealing, and sharing or being given tobacco products. Identifying these and other sources of tobacco and modes of obtaining tobacco products can facilitate more effective and targeted approaches in reducing youth access to tobacco products.[21,23,25]

The Alberta Youth Experience Survey 2002, an AADAC survey, examined the tobacco use and smoking behaviour of Alberta youth aged 11 to 19 years. In this survey, youth were asked about their perception of ease in obtaining cigarettes. Most youth (78%) felt that it would be easy to obtain cigarettes.[7]

Alberta youth in this survey were asked where they usually get their cigarettes. These included both commercial (retail) and social (informal) sources.[7] The following table lists youth responses to this question.

Sources of Cigarettes for Youth Smokers in Alberta

Commercial sources		Social sources	
Small grocer	31%	Given by friend or someone else	52%
Gas station	29%	Bought from a friend or someone else	34%
Another store	15%	Taken from a parent or sibling	18%
Drug store	9%	Given by sibling	8%
Supermarket	8%	Given by parent	8%
Vending machine	7%		

Note: Youth could have selected more than one response.

Source: Alberta Alcohol and Drug Abuse Commission (AADAC). The Alberta Youth Experience Survey 2002: Technical Report. AADAC: Edmonton, AB; 2003.

- Having cigarettes given to youth by a friend or someone else, or buying from a friend or someone else, is the most common source of cigarettes among Alberta youth aged 12 to 17 years.
- Small grocery stores and gas stations are important commercial sources of cigarettes.

Further, age has an impact on where youth usually get their cigarettes. Youth aged 12 to 15 years rely on social sources more than commercial

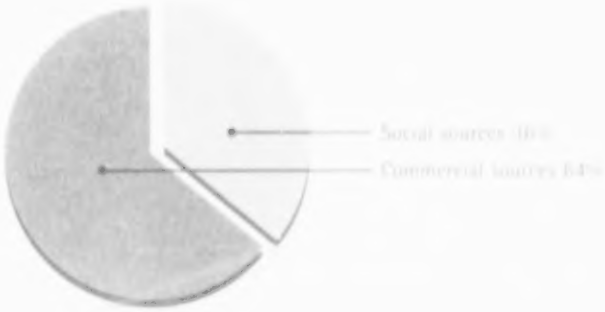
sources. Youth aged 16 and 17 years tend to rely on commercial sources more than social sources. This is illustrated in the following figure.

Source of Cigarettes Among Alberta Youth Age 12 to 17 years, 2002

Results from the 2002 Canadian Tobacco Use Monitoring Survey (CTUMS) revealed some differences in these findings compared to those of The Alberta Youth Experience Survey 2002. This may be because CTUMS studied youth 15 years and older, while the AAHAE survey included a younger group (12 years and older).

According to CTUMS 2002, Alberta youth (15 to 18 years) most often (64%) got their cigarettes from a commercial source, such as a gas station, drug store, supermarket or vending machine. The second most (36%) obtained cigarettes from someone else, for example, by having or being given cigarettes by a friend, sibling or friend.

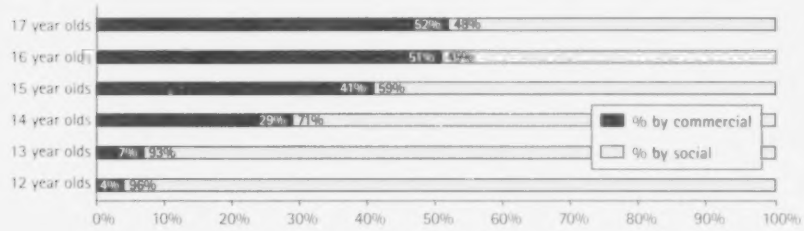
Sources of Cigarettes Among Alberta Youth, Ages 15 to 18, 2002



Comparing a four-year trend (1981 to 2002) from the CTUMS data, Alberta youth's access to cigarettes reflects some consistency. That is, across all four years, youth (15 to 18 years) most often obtained cigarettes from commercial sources. For this age group, a smaller proportion buy or are given cigarettes by someone else.

sources. Youth aged 16 and 17 years tend to rely on commercial sources more than social sources. This is illustrated in the following figure.

Source of Cigarettes Among Alberta Youth Age 12 to 17 years, 2002

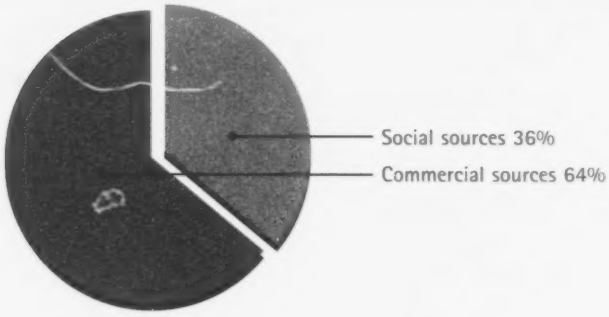


Source: Alberta Alcohol and Drug Abuse Commission (AADAC). The Alberta Youth Experience Survey 2002: Technical Report. AADAC: Edmonton, AB; 2003.

Results from the 2002 Canadian Tobacco Use Monitoring Survey (CTUMS) revealed some differences in these findings compared to those of The Alberta Youth Experience Survey 2002. This may be because CTUMS studied youth 15 years and older, whereas the AADAC survey included a younger group (11 years and older).

According to CTUMS 2002, Alberta youth (15 to 18 years) most often (64%) got their cigarettes from a commercial source (such as a gas station, drug store, supermarket or vending machine). The remainder (36%) obtained cigarettes from someone else, for example, by buying or being given cigarettes by a parent, sibling or friend.[2]

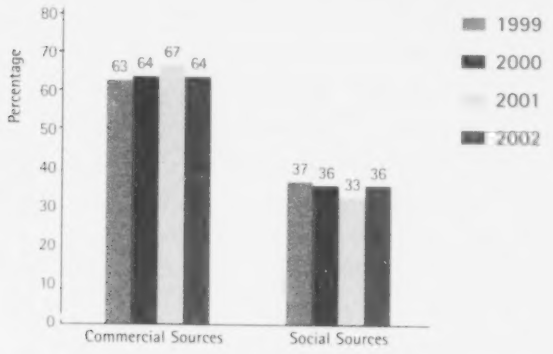
Sources of Cigarettes Among Alberta Youth, Ages 15 to 18, 2002



Source: Statistics Canada. Canadian Tobacco Use Monitoring Survey, 2002.

Comparing a four-year trend (1999 to 2002) from the CTUMS data, Alberta youth's access to cigarettes reflects some consistency. That is, across all four years, youth (15 to 18 years) most often obtained cigarettes from commercial sources. For this age group, a smaller proportion buy or are given cigarettes by someone else.[2, 26-28]

Sources of Cigarettes, Ages 15-18, Alberta 1999, 2000, 2001, 2002



Source: Statistics Canada. Canadian Tobacco Use Monitoring Survey, 1999, 2000, 2001, 2002.

Findings from the literature indicate that teens not only get cigarettes from young adults but also from other teens.

Young adults are a potentially significant source of tobacco to minors.[29,30] Friends share cigarettes with other friends in a reciprocal fashion while some student entrepreneurs appear to exploit other students by selling them cigarettes at high prices.[25]

A study by Forester, Chen, Blaine, Perry and Toomey (2003) examining the social exchange of cigarettes by youth found that about 90% of youth who were current smokers obtained cigarettes from, and about 75% of them had provided cigarettes to, another teen in the month prior to being surveyed. Daily teen smokers provided cigarettes to more teens and provided them more often than those who smoked less than daily. Daily teen smokers reported having more social sources, both teens and adults, than occasional teen smokers, and were more likely to have both bought from and sold cigarettes to other teens.[19]

In addition, much of the tobacco provided by minors to other minors was initially purchased from commercial sources by an adolescent donor.[12,31] Young males are more likely than females to be approached by minors to acquire cigarettes.[29,30]

Some of these self-report surveys have found that adolescent girls may be less likely than boys to report usually purchasing their own cigarettes.[12,32] Additionally, results indicate that girls were less likely than boys to view cigarettes as affordable and easy to obtain.[12]

Factors Influencing Initiation of Smoking

The risk for smoking initiation involves a complex interplay of social, environmental, and personal factors. Much research has gone into examining and understanding the factors that influence smoking initiation.

The social environment of young people continues to be an important instigator of smoking onset.[33] Children take up smoking in response to social influences: smoking by friends, parents, and family, and through exposure to smoking in media. Parents who smoke not only model the behaviour, but also often make the product available by leaving cigarettes around the house. Once children start smoking, many rapidly loose autonomy over the behaviour. Youth can become tobacco dependent after smoking just a few cigarettes.[33, 34] This is an important factor when considering prevention initiatives for youth.

Risk Factors

According to the AADAC 2002 Alberta Youth Experience Survey, three main risk factors were identified by youth:[3]

- Age of the user is the most common risk factor. As youth get older, they are exposed to more risk factors and use/participation is higher.
- Peer risk behaviour and family history of substance abuse are the next most common risk factors identified.
- Family discord, school disconnection and early use of cigarettes also present serious risks for youth.

A 2001 study by Ellickson, Tucker and Klein of 4,327 Grade 7 students and a follow-up of these students in Grade 12 from California and Oregon, compared high risk behaviours associated with early smoking. The results of the study indicated that early experimenters and smokers are more likely than non-smokers to experience various problem behaviours by Grade 12, with many of these problems evident as early as Grade 7. These various behavioural problems include academic problems, engaging in other types of substance use (such as binge drinking and use of hard drugs), and engaging in delinquent behaviour (such as stealing).[35]

Protective Factors

The following are the three factors that are important in providing protection from harmful use (abuse) or dependence on alcohol, gambling and other drugs (including tobacco):[3]

- Parental monitoring and social skills were most important such as good parental monitoring and developed social skills are crucial in helping protect against potential dependency.
- Availablility of, and participation in, pro-social activities emerged as very important factors.
- Good school marks and connection to school were also in the top factors.

A 2002 U.S. study examining the smoking predictive factors for students between fifth and eighth grades found that tobacco use by parents, siblings, and friends, and easy accessibility in the home in fifth grade, were significant predictors for smoking in the eighth grade. In fact, the strongest factor influencing smoking in eighth grade was having a best friend who smoked. And, intention not to smoke in fifth grade predicted non-smoking in eighth grade.[36]

A review of initial tobacco use episodes was undertaken by Eissenberg and Balster (2000) and found that studies which asked adolescents to recall their initial experience with tobacco, provide some support for the notion that adolescent smokers who eventually become regular tobacco users report fewer negative effects from their initial use episode compared to adolescents who do not become regular users. However, in some studies, eventual regular users reported that they felt more positive effects, as has been reported by adult smokers. Also more experienced peers may influence how first-time users perceive some tobacco effects.[37]

Factors predictive of cigarette smoking are also highly associated with other tobacco use. Among those who had smoked one or more times, having peers who used other tobacco products was highly associated with other tobacco use. Problem or risky behaviours, beliefs that cigarettes are safe or beneficial, and receptivity to tobacco promotions are also independently associated with other tobacco product use.[38]

Tobacco Dependence

It is increasingly recognized that adolescents who smoke are at risk of becoming dependent on tobacco.[38, 39] Although youth who smoke demonstrate some of the characteristics of dependence observed in adults, it remains unclear how dependence develops, manifests, and is accurately measured in youth.[15]

Physical Aspects of Addiction

Tobacco dependence has been characterized narrowly as physical dependence on nicotine. It is often referred to as nicotine dependence or addiction, and includes nicotine-seeking behaviour and the avoidance of withdrawal symptoms. This, however, fails to capture tobacco dependence that is evolving in those who are beginning to smoke and may not have yet experienced cravings or withdrawal.[15]

Youth experiences with tobacco dependence are variable. Following smoking initiation, some youth experience physical symptoms rapidly,[11, 35, 40-42] others have a slower onset,[11] and still others do not show any physical symptoms at all.[11]

One reason why adolescents may not readily stop smoking is that they are dependent on nicotine, even before they become regular or daily smokers. The evidence to date suggests that a substantial proportion of adolescent smokers can be classified as nicotine dependent,[41] with prevalence rates ranging from 19 to 68%.[43-45]

Some adolescents who try to stop smoking display a strong focus on their withdrawal symptoms,[47] and indicate that they are unable to refrain from smoking despite their best intentions.[46, 47]

People who start smoking younger are also more likely to develop high levels of nicotine dependence than those who start later: they have more difficulty quitting and thus accrue more of the negative health effects of smoking. Thus, delaying cessation efforts past the adolescent years has negative health ramifications as well as during the later adult years.[11]

Psychosocial Aspects of Addiction

However, youth smoke for a variety of reasons and their dependence or need to smoke may not solely be based on an addiction to nicotine.[41]

Results from a 2003 qualitative study by Johnson, Bottorff, Moffat, Ratner, Shoveller and Lovato found that although the adolescents did not spontaneously use the term "dependence" in their discussions about needing cigarettes, the manner in which they spoke about being "controlled by cigarettes," "needing to smoke," and "being addicted" to cigarettes revealed that their experience and understanding of dependence extended well beyond the need for nicotine. These adolescents described smoking cigarettes as a means of meeting a variety of needs

occurring both regularly and irregularly. According to young people in this study, there are degrees of tobacco dependence and adolescents smoke varying amounts for different reasons: to meet social and emotional needs, for pleasure, or to feel empowered, for example.[15]

Thus, tobacco dependence emerges over time and different personal and environmental factors account for this experience.[42] Understanding the role that nicotine plays in the early tobacco use experiences and identifying individual differences that influence the pattern and rate of progression across the stages of use into dependence may be key to identifying youth who are at high risk for long-term smoking and who are most in need of intervention.[11, 35]

Cessation Among Youth

Adolescent smokers frequently report difficulty in quitting or a lack of confidence in their ability to do so.[48, 49] In contrast is a finding that most of the adolescent smokers surveyed (72.3%) felt that they could stop smoking if they wanted to.[47] However, many of them do want to quit smoking.[11]

Spontaneous quit rates amongst adolescents are found to be relatively low.[47, 50-53] The rates of spontaneous quitting amongst adolescents who regularly smoke are similar to that of adults; about 5 to 6% of adults who try to quit smoking at any given time are successful for one month or more.[12]

Very few adolescent smokers stop smoking without some form of intervention. The spontaneous or unassisted quit rates among adolescents is low primarily because of the assumption that adolescents "mature out" of smoking or easily quit on their own.[11]

Building self-esteem and substituting more desirable mechanisms for coping with the stresses of the teenage years may prove to be a most promising intervention, using activities that are appropriate within the social norms of each socio-demographic group. Adolescent smokers need cessation programs that are school-based (to promote access), that encourage family and community involvement (to counteract authority figure stigma), and that provide nicotine replacement therapy where addiction is present. Prevention needs to begin early and continue without ceasing, and should include family involvement and the goal of changing social norms.[54]

(Refer to the chapters "Cessation of Tobacco Use" and "Nicotine Addiction" for more information.)

Strategies to Reduce Tobacco Use Amongst Youth

Raising taxes is a strategy that is especially effective among young smokers and potential smokers, who are very sensitive to the price of cigarettes.[12, 55] In developed countries, a price increase in cigarettes (often occurring in the form of taxation) of 10% has been shown to reduce youth smoking by 8%.

Youth tobacco use can also be reduced through the following strategies:

- halting the sale of tobacco to minors[34]
- making public places and homes smoke-free[55-57]
- enforcing school tobacco policies[34]
- conducting large, well-designed media campaigns that counter marketing by the tobacco industry[58-61]
- educating youth about the effects of second-hand smoke[62]
- providing and publicizing cessation programs for youth[11]

Youth tobacco control programs from the 1970s to the mid-1990s focused primarily on prevention and little on cessation. The assumptions were as follows:

1. Prevention was the more effective means to reduce tobacco use among adolescents.
2. Adolescent smokers were unlikely to be dependent on nicotine and could probably stop smoking if they wanted to.
3. Adolescents were not interested in stopping smoking.
4. Effective cessation programmes for adults could easily generalize to adolescents.

New research has challenged these assumptions, and current programs often reflect a greater understanding of the need for cessation programs tailored to current adolescent smokers, many of whom say they want to quit but have been unsuccessful. Ultimately, a comprehensive youth tobacco control initiative is what is needed to discourage youth from starting smoking and aid and encourage those who have started to quit.

In the 2003 AADAC Public Opinion Survey, Albertans were asked to rate their level of support for potential ways to prevent young people from smoking.[63]

Youth Prevention Measure	% Somewhat or Strongly Agree
Education in schools	91
Banning smoking where youth are allowed	83
Non-smoking role models	82
Television ads	77
Against the law for youth under 18 to smoke	72
Increase tobacco taxes	56

Source: AADAC. Alberta Alcohol and Drug Abuse Commission 2003 Public Opinion Survey. Edmonton, AB; April 2003.

Summary

According to the Canadian Community Health Survey (2000/2001), 18% of Alberta teens (12 to 19 years old) were current smokers in 2001.[1] Young Albertans and Canadians and Albertans (20 to 24 years old) have higher current smoking rates than any other age group. In Alberta, 30% of young Albertans aged 20 to 24 years are current smokers (smoking daily or occasionally); this is a higher rate than any other age group. In addition, the highest proportion of occasional smokers (9%) are found among the young adults age 20 to 24 years.[2]

According to the Canadian Tobacco Use Monitoring Survey (CTUMS), 65% of Albertans who have ever smoked a cigarette said that they had smoked their first cigarette by age 16. By age 18, 79% had tried their first cigarette. Typically, experimentation with smoking begins between the ages of 12 and 16.[2] The social environment of young people has a strong influence on smoking onset.

Youth in Alberta get their cigarettes from both commercial sources (such as tobacco retailers, Internet vendors, and vending machines)[21-24] and non-commercial or social sources (such as parents, siblings and other family members, friends, acquaintances, and even strangers).[22]

In addition to social, psychological and cultural factors, nicotine dependence is also a factor associated with smoking among young people. Youth experiences with tobacco dependence are variable. Following smoking initiation some youth experience physical symptoms rapidly,[11, 35, 40-42] others have a slower onset,[11] and still others do not show any physical symptoms at all.[11] Thus, strategies to reduce tobacco initiation and use amongst youth should address the social, psychological, physical and cultural aspects of smoking amongst youth.

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SMOKING AND PREGNANCY

Quick Facts

- About three in 10 (32%) of women in Alberta smoked during their last pregnancy, according to the 2000/2001 Canadian Community Health Survey (CCHS).[1]
- Women who smoke during their pregnancy are much more likely to deliver a low-birth-weight baby.[2-4]
- Low-birth-weight babies are at increased risk of severe health problems and neonatal (newborn) death.[5,6]
- Maternal smoking also increases the risks of miscarriage, stillbirth and death of the newborn within the first few weeks of life.[6-8]
- In Alberta, sudden infant death syndrome (SIDS) is 1.4 to 4.4 times more common among babies whose mothers smoke during pregnancy.[9]
- Exposure to environmental tobacco smoke (ETS) after birth is associated with increased incidence of SIDS.[10]
- Growing evidence suggests that maternal smoking during pregnancy may be associated with deficits in intellectual ability, behavioural problems, and physical malformation among children of those women.[11-16]
- Between 50 and 70% of pregnant women who smoke continue to smoke during their pregnancy.[17-19]

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SMOKING AND PREGNANCY

Smoking creates significant health risks for pregnant women and unborn babies. Among women who smoke, the risks of tobacco use include reduced fertility and miscarriage. The risks to the fetus include low birth weight, stillbirth and sudden infant death syndrome (SIDS). **Consequently, smoking during pregnancy is an important public health issue.**

The earlier in pregnancy that women stop smoking, the greater the benefit to their babies.[1]

Prevalence of Smoking During Pregnancy

Prevalence studies in the 1990s show that between one in five and one in three pregnant women in developed countries report smoking.[2] In Canada, the results are similar. The 2000/2001 Canadian Community Health Survey found that an estimated 32% of women in Alberta and 30% of women in Canada smoked during their last pregnancy.[3]

Smoking and Pregnancy: The Alberta Picture

A 2002 Alberta Health and Wellness report[4] examined maternal risk factors in relationship to birth outcomes, including the use of tobacco by all pregnant women in Alberta between 1998 and 2000. The report found that 25.7% of Alberta women who gave birth to a live infant between 1998 and 2000 smoked at some point during the pregnancy.

When we look at the data by year between 1998 and 2000, we observe that 26.8% (1998), 25.7% (1999) and 24.6% (2000) women in Alberta said they smoked at some point during their pregnancy.[4]

Smoking during pregnancy is more common among younger Alberta mothers: 60% of pregnant women under the age of 18 report tobacco use compared to less than 20% of pregnant women aged 35 and older.[4] Between 1998 and 2000, the average maternal age for smokers in Alberta was 25.8 years; average maternal age for non-smokers was 29.1 years.[4]

Mortality

Smoking during pregnancy has a significant impact on childhood mortality. Alberta Health and Wellness has reported the relationship between maternal smoking and childhood mortality in Alberta. The current mortality rate is 3.9 deaths per 1,000 among non-smokers compared to 13.0 per 1,000 for heavy smokers and 11.1 per 1,000 for light smokers.[4]

Low Birth Weight

Smoking among Alberta women is associated with a significantly increased risk of low infant birth weight. The average birth weight for babies in Alberta born to smokers between 1998 and 2000 was 3,266 grams, compared to 3,429 grams for babies born to non-smokers, a difference of 163 grams. The low-birth-weight rate for smokers is 8.3 (per 100 live births); the rate for non-smokers is 5.2.[3]

Smokers are more likely to give birth to a premature infant (those born before 37 weeks gestation) than are non-smokers. Conversely, non-smokers were more likely to carry their babies to term. In addition, the majority of premature infants are low birth weight. The premature birth rate for smokers in Alberta between 1998 and 2000 was 9.1 (per 100 live births), while the rate was 7.3 for non-smokers.

While all smokers are at increased risk for having a low-birth-weight baby, this risk is particularly pronounced among mothers over the age of 30.

Health Effects of Smoking During Pregnancy

Different patterns of timing (when during the pregnancy), duration (how long), and intensity (the amount) of fetal exposure to toxic chemicals in cigarettes result in differences in the effect of smoking on fetal health.[5-7]

The toxic chemicals in tobacco pass through the placenta to the fetus.

Nicotine, carbon monoxide and carcinogens (cancer-causing chemicals) are all found at increased levels in the fetuses of smoking mothers and in non-smoking mothers who are exposed to environmental tobacco smoke (ETS).[8,9]

Because the harmful compounds in tobacco pass through the placenta, maternal smoking (or maternal use of spit tobacco) creates serious health problems for infants both before and after birth, and can even result in death.[10]

Placenta abnormalities are fairly common in women who smoke during pregnancy. Women who smoke suffer more often with placental abnormalities and a low-lying placenta (placenta previa).[11]

Maternal smoking in pregnancy increases the risk of low birth weight, miscarriage and sudden infant death syndrome (SIDS). Maternal smoking is also associated with childhood problems, such as reduced lung function, increased risk of respiratory illness in early infancy,[16] and middle ear disease in childhood.[17] In each case, a dose-response relationship has been observed (that is, higher levels of tobacco use are associated with higher levels of risk). So cutting down on smoking

TOXINS THAT PASS THROUGH THE PLACENTA

Nicotine

Scientists have found that nicotine levels in the fetuses of mothers who smoke are actually higher than those found in the mother – about 15% higher, in fact.[4] Nicotine is also passed on to babies through the breast milk of smoking mothers.[5]

Carbon monoxide

Carbon monoxide attaches more readily to fetal hemoglobin than to adult hemoglobin and interferes with oxygen delivery and release.[6]

Carcinogenic chemicals

Scientists have not yet found a definite link between maternal smoking and childhood cancer or cancer occurring later in adulthood. However, they have discovered that carcinogens (cancer-causing substances) such as benzopyrene, aminobiphenyl and acrylonitrile cross the placenta. The fetus of a smoking mother can have levels of these chemicals that are 10 to 20 times higher than the fetus of a non-smoker, and the fetus of a mother who is exposed to ETS can have levels that are four to five times higher than the fetus of a mother who is not exposed to ETS.[7]

Male fertility is also affected by smoking.[12-15] Men who smoke have fewer sperm, and their sperm moves less efficiently. A 1996 meta-analysis showed that cigarette smoking is associated with modest reductions in semen quality including sperm concentration, motility and morphology.[12]

during pregnancy can help, but no amount of smoking during pregnancy is risk-free.[5]

Low Birth Weight and Premature Delivery

Babies born to smokers weigh less than babies born to non-smokers. Low birth weight can result in severe health problems and neonatal death.

The birth weight of a baby is dependent on two factors: the gestational age of the fetus at the time of delivery (whether the baby is premature or full term) and the growth rate up until delivery. Nicotine has been shown to affect both of these factors, often resulting in low-birth-weight babies (less than 2,500 grams or 5.5 pounds).[5]

Gestational age at delivery, a major determinant of infant birth weight, is also affected by smoking during pregnancy.[15] On average, gestational age at delivery is three to five days shorter for babies with smoking mothers than for those born to non-smokers.[16]

In fact, cigarette smoking during pregnancy has been shown to be an independent predictor of infant birth weight: the more a woman smokes during pregnancy, the less her baby will probably weigh.[20]

A pregnant woman who smokes is between 1.5 and 3.5 time more likely than a non-smoker to have a low-birth-weight baby.[21] Babies born with a low birth weight account for about 75% of all deaths in the first week of life. Low-birth-weight babies are at increased risk for various disabilities, including growth and development problems, delayed speech, cerebral palsy, visual and hearing difficulties, learning disabilities and respiratory problems.[22] An estimated 11 to 21% of all low-weight births are associated with exposure to tobacco products.[23]

The benefits of smoking cessation at any point during pregnancy are substantial. Babies have been found to have higher birth weights.[24] It has been found that infants of women who quit smoking by the first trimester have weight and body measurements comparable to infants of non-smokers.[24] Even when women quit smoking in their third trimester their babies have higher birth weights compared to those whose mothers do not quit.[24] However, these newborns still lag behind those whose mothers did not smoke at all during pregnancy.[4]

Recent findings show that maternal smoking is not the only problem: non-smoking mothers who are consistently exposed to ETS (environmental tobacco smoke) are also at increased risk for having low-birth-weight babies.[25]

- Low-birth-weight babies are also at greater risk for ETS-related respiratory illnesses than newborns of normal birth weight.[5]
- Research is beginning to suggest that there may be a genetic predisposition to smoking-induced growth retardation (low birth weight). This could explain why not all women who smoke during pregnancy have small babies.[5]

Miscarriage

Maternal smoking increases the risk of miscarriages.

The association between smoking and miscarriages has been established in scientific studies for more than 20 years, and the results have been fairly consistent: the risk of miscarriage in smokers in the first 20 weeks of pregnancy is higher than in non-smokers.[22] A pregnant women who smokes is 1.6 times more likely than a non-smoker to have a miscarriage.[28]

Smokers also have a harder time getting pregnant because smoking lowers a woman's fertility.[5]

The effects of smoking on both miscarriage and fertility are dose-dependent and, ultimately, reversible: former smokers do not have higher miscarriage rates[22] or lower fertility rates.[5]

Stillbirth

Maternal smoking increases the risk of stillbirth.

The risk of stillbirth and death within the first few weeks of life is higher in babies of smokers. The risk is partly due to the increased risk of premature birth and low birth weight. Both of these are associated with neonatal death. Premature labour is twice as common in pregnant smokers.[29]

Sudden Infant Death Syndrome (SIDS)

Maternal smoking increases the risk of sudden infant death syndrome (SIDS) or crib death.[30]

Substantial literature exists on the relationship between smoking and sudden infant death syndrome.[4] It is estimated that more than one third of all SIDS deaths are due to maternal tobacco use.[16]

Women in Alberta who smoke during pregnancy are 1.4 to 4.4 times more likely to have a baby that dies of SIDS.[4]

The most dramatic effect of maternal smoking is the increased risk of SIDS. SIDS is the most common cause of death in babies between the second week and first year of life.

Exposure to ETS after birth is also associated with increased incidence of SIDS.[31]

Developmental and Behavioural Problems in Children

Growing evidence suggests that maternal smoking during pregnancy may be associated with deficits in intellectual ability and behavioural problems in children.

Maternal smoking during pregnancy has been assessed as a risk factor for a variety of behavioural and neurodevelopmental problems in children. These include reduced general intellectual ability, problems with language and auditory tasks, lower academic achievement, and behavioural problems such as hyperactivity and decreased attention span.[32-34] Specific tobacco-related symptoms emerging from the most recent research include increased risk for [32-37]

- lower school performance
- reduced cognitive abilities
- reduced fine motor skills
- disruptive behaviour
- depression
- anxiety
- externalizing behavioural problems
- conduct disorder (older children)
- substance abuse (older children)

It is difficult to establish definitive causal relationships in an area as complex as behavioural and neurodevelopmental problems. However, this relatively new area of study is receiving a lot of attention, and evidence is mounting.

As research continues in the area of smoking and reproductive health, we will begin to more fully understand the full range of effects that smoking might have on the fetus. Until then, the known problems associated with smoking during pregnancy are severe enough to make this a very important area of focus for tobacco reduction.

Quitting Behaviour During and After Pregnancy

Studies examining the effects of stopping or reducing smoking during pregnancy on perinatal outcomes have shown that quitting smoking protects fetal growth.[3-7]

Smoking during pregnancy is a complex and variable behaviour for many women.

Pregnant women who smoke are increasingly aware that smoking may be harmful to their offspring and are under significant social pressure to quit. Many women stop smoking upon learning they are pregnant. Those who do not quit for the duration of their pregnancy may quit, reduce, and relapse multiple times during pregnancy, balancing their desire to promote the health of their infant against nicotine dependence, stress, and other pressures that induce smoking.[38]

In general, studies have found that from 13 to 40% of female smokers quit when planning to become pregnant or upon finding out they are pregnant.[39-42] The majority of women who stop smoking do so in the first trimester;[43] an additional 2 to 22% may quit later in their pregnancy.[39,40] For those who do not quit, about 50% reduce the number of cigarettes they smoke.[39,40]

However, between 50 and 70% of pregnant women who smoke continue to smoke during pregnancy.[44-46]

For those women who quit during their pregnancy (also know as "spontaneous pregnancy quitters"), smoking cessation appears to reflect a deliberate effort to protect the baby, rather than a long-term intention to quit. That is, they seem to have "suspended" their smoking rather than actually quit.[39,40]

As such, postpartum relapse is substantial: between 50 and 75% of those that quit during pregnancy relapse to smoking within six months postpartum, and 70 to 90% by one year postpartum.[39,47,48] Further relapse can occur up to three years after delivery.[46]

The PRAMS study (Pregnancy Risk Assessment Monitoring System) of the Centers for Disease Control (CDC), described smoking before, during and after pregnancy in 10 U.S. states between 1993 and 1999. The study found that just over 40% of women quit smoking from the period three months before pregnancy to three months before delivery, but almost 60% of quitters resumed smoking within six months postpartum.[47]

Factors Associated with Smoking Cessation During Pregnancy and Postpartum

Knowing the social, psychological and behavioural factors contributing to smoking cessation, or lack thereof, amongst pregnant smokers can have implications for identifying appropriate and effective smoking cessation approaches.

There are marked social differences between women who smoke during their pregnancy and those who do not. Public health efforts have mostly focused on pregnant women who are responsive to relatively brief, prenatal cessation interventions.[50] Yet the heaviest smokers — those whose fetuses are at greatest risk — are the least responsive to such interventions.[51]

Certain settings and features are associated with persistent smokers (those who do not quit during their pregnancy).[45,52-56] They tend to be younger than the pregnancy quitters (those who quit smoking just before or during their pregnancy). They tend to have a lower income, to have a greater dependence on nicotine, and to have access to fewer

A 2003 study by Wakschlag, Pickett, Middlecamp, Walton, Tenzer, and Leventhal identified specific factors associated with pregnancy smokers as compared to those pregnancy quitters and non-smokers:[57]

Interpersonal factors, such as

- adolescent history of running away from home
- history of initiating fights as a teen
- aggressive interactions in adulthood
- poor quality relationships with partners
- repeated lying as a teen
- having children with multiple partners
- co-residing with multiple men in non-marital relationships
- low marital adjustment
- irritable, aggressive interpersonal relationships

Adaptive factors, such as

- adolescent history of dropping out of high school
- frequent truancy
- thievery as an adolescent
- stressful/difficult life circumstances
- lack of community life skills
- a history of arrest

Health factors, such as

- late entry into prenatal care
- little use of preventive health care
- irregular use of prenatal vitamins
- teenage first birth
- substance abuse

resources. They are also less likely to have a partner, more likely to be single parents, and less likely to have completed high school. They are more likely to be experiencing a high level of stress and to be living in an environment where smoking is more common (e.g. having a partner who smokes).

A recent study investigated several social and behavioural factors and identified the fact that pregnancy smokers were more likely than both pregnant quitters and non-smokers to have problematic relationships, to have poorer adaptive functioning and to be engaged in problematic health behaviours.[57]

Women who continued to smoke during pregnancy were more likely to display a pervasive pattern of problem behaviour, both during adolescence and as adults. Interpersonally, pregnant smokers were more likely to be impulsive and reactive in their social interactions and to have a pattern of unstable relationships. For example, the interpersonal relationships of persistent smokers were marked by irritable, aggressive interactions, and instability.[57]

In terms of adaptive functioning, persistent smokers were less likely to successfully attain life course achievements (e.g. high school completion) than pregnant quitters or non-smokers, were less connected to community resources, and expressed difficulty in establishing regular daily routines.[57]

Women who smoked during pregnancy also exhibited other risky health behaviours, including poor health care practices in pregnancy (e.g. late entry into prenatal care).[57]

These findings suggest that pregnant women who are unable to quit smoking during pregnancy also exhibit difficulty in modulating their behaviour in many other aspects of their lives.[57]

Examining pregnancy smoking as part of a broader matrix of problem behaviour may help to identify pregnant women most at-risk for persistent smoking and to inform the development of targeted interventions. This is because smoking during pregnancy is not an isolated health-compromising behaviour that mothers engage in, but rather is part of a long-standing pattern of behaviour across interpersonal, adaptive, and health domains.[57]

Psychosocial associations with continued smoking during pregnancy also include depression, job strain/workload, and low levels of practical support.[58-60]

Postpartum Cessation

When women enter the stressful postpartum period, they may be unprepared to maintain their smoking cessation. After six months

postpartum, women continue to experience significant changes in their lives as they return to work, begin to socialize more frequently, provide child care for increasingly active infants, wean from breast feeding, and resume or expand the management of multiple roles.[61, 62] All of these transitions present new risks.

For some women, stopping smoking is relatively easy in the context of pregnancy. Consequently, relapse rates are relatively high postpartum because it is not until after delivery that women start truly engaging in the experiential and behavioural processes associated with the action phase of smoking cessation.[63]

Other factors that may be associated with postpartum smoking relapse are depression, having a partner who smokes, minimal support for cessation efforts, dissatisfaction with weight, and the amount smoked prior to pregnancy.[47]

Cessation Approaches for Pregnant Women

The quality of evidence is varied regarding the success rates of cessation programs for pregnant women. Studies indicate that smoking cessation interventions during pregnancy can achieve success rates of between 2% and 20%.[64]

Although pregnancy cessation interventions can reach a large number of pregnant women, even the most effective "best practices" interventions are successful with, at best, only 20% of women.[1] Understanding patterns of cessation, reduction, and relapse over the course of pregnancy may be vital to developing targeted interventions for pregnant women for whom standard interventions are not successful.[38]

In a review of smoking cessation programs during pregnancy, The Cochrane Database of Systematic Reviews[1] concluded that smoking cessation programs need to be implemented in all maternity care settings since these programs have shown to increase smoking cessation, increase the mean birth weight, and reduce low birth weight among newborns.

A key factor in reducing smoking during pregnancy is the role of the healthcare providers in identifying and treating pregnant smokers. As such, healthcare providers who care for pregnant women are in a unique position to identify and intervene with pregnant smokers.[65]

Research shows that tobacco treatment interventions by healthcare providers can increase the number of patients who successfully quit. The U.S. Public Health Service (PHS) Clinical Practice Guideline, developed in 2000, provides recommendations and guidelines to assist healthcare providers to integrate a tobacco treatment intervention into an office setting. These clinical practice recommendations are based

on a review of 3,000 articles in the research literature and dozens of meta-analyses.[66, 67]

The PHS Clinical Practice Guidelines recommend that all patients, including pregnant women, should be asked about tobacco use and should have their tobacco-use status documented on a regular basis.[66] Specifically, these guidelines recommend that healthcare providers 1) **Ask** all patients about their tobacco use; 2) **Advise** patients to stop using tobacco; 3) **Assess** their willingness or motivation to quit; 4) **Assist** patients interested in cessation efforts; and 5) **Arrange** appropriate follow-up.[66, 67] This is known as the **5 A's approach**.

Summary

The 2000/2001 Canadian Community Health Survey found that 32% of women in Alberta and 30% of women in Canada smoked during their last pregnancy.[2]

Research has shown that women who smoke are more likely to have problems becoming pregnant and that pregnant smokers experience higher rates of miscarriage, stillbirth, and pregnancy complications than do non-smoking pregnant women. Children who are born to mothers who smoke weigh less at birth than children born to non-smoking mothers and are more likely to be born prematurely. These children are also at greater risk for sudden infant death syndrome (SIDS) and have more childhood illnesses than do children born to non-smoking mothers.

Although many women are aware of the harmful effects of smoking, only about 13% to 40% may quit smoking before they become pregnant or once they learn they are pregnant.[39-42] The remainder may reduce the number of cigarettes they smoke or continue to smoke throughout their pregnancy. Even among those who quit before or during pregnancy, relapse to smoking postpartum is common.

Thus, assisting pregnant smokers and women of childbearing age to quit smoking is an important public health issue. Those who devise cessation programs targeted for pregnant women need to understand some of the reasons women continue to smoke during pregnancy, or to relapse during or after pregnancy, and to incorporate these factors into their programs.

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NICOTINE ADDICTION

Quick Facts

- According to results from the AADAC 2003 Public Opinion Survey, 95% of Albertans somewhat agreed or strongly agreed that tobacco is highly addictive.[1]
- 33% to 50% of people who experiment with cigarettes become regular users.[2]
- 70% to 90% of people who are regular users are addicted to nicotine.[2]
- Withdrawal symptoms include depression, insomnia, irritability, anxiety, difficulty concentrating, restlessness, decreased heart rate, increased appetite, weight gain and craving for nicotine.[3]
- Withdrawal symptoms peak 24 to 48 hours after cessation and can last from three days to four weeks, although the craving for a cigarette can last for months.[4]
- Relapse rates for quitters are high: about 60% relapse in three months, and 75% in six months.[5]
- Relapse is the rule, not the exception, and must be viewed as part of the cessation process.

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NICOTINE ADDICTION

It is clear that smoking is addictive: some people continue to use tobacco even when they wish they could stop. But addiction is very complex and highly individual. Not surprisingly, many smokers try to quit. About 45% of Albertans and Canadians[1] who currently smoke, have tried to quit at some point.

What makes smoking and other forms of tobacco so hard to give up?

Researchers have recognized for some time that, while the nicotine in tobacco creates a strong physical addiction, psychological and social factors also contribute to the addictive nature of tobacco.

In the 2003 AADAC Public Opinion Survey, 95% of adult Albertans somewhat or strongly agreed that tobacco is highly addictive. Further, 89% somewhat or strongly agreed that quitting smoking is possible.[2]

Addiction Rates

Of the people who experiment with cigarettes, 33% to 50% become regular users. And 70% to 90% of people who are regular users are addicted.[3]

Smoking is so addictive that many people continue to smoke even when their lives are in immediate danger. Studies have shown that

- 40% of those having their voice box removed (laryngectomy) continued to smoke afterwards.[4]
- 38%[5] to 50%[5,6] of smokers who have had a heart attack start smoking again while still in hospital, most within 48 hours of coming out of intensive care.
- 25% of smokers admitted to a smoke-free hospital reported smoking during their hospital stay.[7]

Physical Aspects of Addiction

Smoking is more than a habit. The nicotine in tobacco causes physical addiction.[8]

Nicotine is considered addictive for the following reasons:

1. It is psychoactive.

Nicotine is a drug that acts on the brain and affects mood and cognitive function (that is, it stimulates and it affects concentration).[5]

2. People use it compulsively.

Most smokers smoke 10 or more cigarettes every day. In Alberta and Canada, daily smokers smoke an average of 16 cigarettes per day.[1] Very few people are able to have a cigarette every now and then: in Alberta, only 5% of smokers are occasional (non-daily) smokers.[1]

3. It is a "reinforcer."

One of the features that indicate that a drug is addictive is that it reinforces a cycle of drug-taking behaviour. Nicotine is a reinforcer because it causes many smokers to continue smoking in order to avoid the pain of withdrawal symptoms. Smokers also adjust their smoking behaviour (inhaling more deeply, for example) to maintain a particular level of nicotine in the body.[5]

Psychosocial Aspects of Addiction

Psychological and social factors also make smoking highly addictive.

One of the most obvious reasons that smokers continue to smoke is that it gives them pleasure: the pleasure of handling the cigarette, the oral satisfaction of drawing on the cigarette, or the comfort of a quick fix in times of boredom, frustration, anger or stress. Also, use of tobacco may be associated with and reinforced by other pleasurable feelings, such as those produced after eating a meal, while socializing, or after drinking alcohol.

If the pleasure of smoking outweighs the pain, smokers will be unmotivated to quit. And, while smokers may experience a daily level of discomfort (such as having to go outdoors to smoke, smelling like smoke, experiencing smoker's cough, and having shortness of breath), the immediate consequences of smoking are not severe. Smokers, unlike some alcoholics or heroin addicts, are not in immediate danger of losing their jobs or families because of their addiction. It becomes easy, then, to put off quitting or to resume smoking after a cessation attempt.

Withdrawal Symptoms

According to the American Psychiatric Association, nicotine withdrawal can include any of the following symptoms: depression, insomnia, irritability, anxiety, difficulty concentrating, restlessness, decreased heart rate, increased appetite, weight gain and craving for nicotine.[1]

Withdrawal symptoms peak 24 to 48 hours after cessation and can last from three days up to four weeks, although the craving for a cigarette can last for months.[1]

Smokers who typically smoke at least 15 cigarettes per day or who smoke their first cigarette of the day within 30 minutes of waking are likely to experience nicotine withdrawal symptoms and to find quitting uncomfortable.[1]

Quit Rates

The 2002 Canadian Tobacco Use Monitoring Survey (CTUMS) documented the quit attempts made by Canadians and Albertans.

When asked about attempts made to quit smoking, the responses are similar for males and females in Canada. About half (55%) of Canadian smokers made no attempts to quit smoking in the past 12 months. Approximately 36% made one to three attempts to quit smoking in the past 12 months. Youth make more attempts to quit smoking than adults do.[12]

Canadian smokers who "recently" (less than a year ago) quit smoking (short-term quitters) or have "successfully" quit smoking one year ago or more (long-term quitters) comprised 54% of all those who ever smoked, as described in the 2002 Canadian Tobacco Use Monitoring Survey. Specifically, 4% were short-term quitters and 48% long-term quitters.[13]

For smokers in Alberta, 55% made no attempts to quit in the past 12 months while 34% made one to three attempts to quit over this time period.[12]

The good news is that many Albertans, aged 15 years and older, have quit. There are now just as many former smokers (24%) as there are current smokers (23%) in Alberta. Males are more likely to be former smokers than females in Alberta (28% vs. 21%). In Canada, there are more former smokers (25%) than current smokers (21%).[1]

In the 2002 Canadian Tobacco Use Monitoring Survey, Albertans who smoke were asked what it would take for them to quit smoking.[1] Albertans who are current or daily smokers said they were most likely to quit if they had more willpower (27%) or encountered increased cost/difficulty affording cigarettes (9%). The second answer was more likely to be given by Albertans whose level of income adequacy was low. Two in 10 (20%) of Albertans whose income was low stated that "increased cost/difficulty affording cigarettes" was the main factor that would motivate them to quit smoking.

Other possible factors that would cause or help current smokers to quit were mentioned, but rarely. They included

- getting smoking-related illness/fatal disease
- smoking-related illness/death of family member/friend
- pressure to quit from family/friends
- better support and help from family/friends
- effective/affordable stop-smoking program/cigarette substitute
- more restrictions on where smoking is allowed
- change of lifestyle (different job, less stress)
- getting pregnant or planning to have children

Some of the most common methods Albertans have used to quit smoking, whether successful or not, are to quit cold turkey/no formal assistance (85%) and to use the nicotine patch (9%).[1]

Relapse

There is a high rate of smoking relapse (starting smoking again after quitting). The rate is, in fact, about the same for smoking as for using

heroin and alcohol: about 60% of quitters relapse in three months, and 75% in six months.[5] Less than 5% of smokers who quit without the help of programs or therapies maintain continuous abstinence for one year or more.[11]

Relapse can be an important opportunity for learning. What is viewed by some as failure can be a key part of the cessation process.

If relapse is used constructively, it can become an effective tool, preparing the smoker for the next attempt. The relapsed smoker is in a good position to evaluate available cessation methods and decide what might work the next time. In fact, studies show that smokers with a quitting history have a better chance of achieving abstinence in the next year or two.[14]

The high rate of relapse can be discouraging. However, growing research on the physical aspects of addiction and the psychological aspects of behaviour change have helped to increase the smoker's chances of abstinence. The support offered to smokers today is based on an appreciation for the complexity of the cessation process, a process that is influenced by many interrelated factors, including[4]

- the degree to which the smoker is motivated to quit
- the extent of the smoker's biological and psychological addiction to nicotine
- the smoker's mood or mental state
- the smoker's level of confidence
- the smoker's past experience with cessation
- the smoker's environment (home, work and leisure)
- the influence of family and friends, and day-to-day events

Why Albertans Relapse

In the 2002 Canadian Tobacco Use Monitoring Survey (CTUMS), Albertans who smoked were asked to respond to the question, "Why did you begin to smoke again?" The three main reasons given by current smokers who had tried to stop smoking in the past year were[1]

- stress, need to relax or to calm down (18%)
- addiction (16%)
- habit (14%)

However, the relative importance of reasons given for beginning to smoke again varied between males and females.[1]

Among males, the top three reasons to begin smoking again after trying to quit in the past year were[1]

- habit (22%)
- stress, need to relax or calm down (14%)
- other reasons, not specified (14%)

Among females, the three most frequently given reasons were[1]

- stress, need to relax or calm down (22%)
- addiction (19%)
- family or friends smoke (12%)

Summary

Tobacco is a highly addictive substance. In a 2003 AADAC Public Opinion Survey, 95% of adult Albertans somewhat or strongly agreed that tobacco is highly addictive. Further, 89% somewhat or strongly agreed that quitting smoking is possible.[2]

Smokers do try to quit. About 34% of Albertans and 36% of Canadians who smoked did make one to three attempts to quit smoking in the past 12 months.[12] In the 2002 Canadian Tobacco Use Monitoring Survey (CTUMS), when Albertans were asked what it would take for them to quit smoking, 27% said "more willpower," and 9% said "increased cost/difficulty affording cigarettes."[1]

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CESSATION OF TOBACCO USE

Quick Facts

- According to results from the AADAC 2003 Public Opinion Survey, 89% of Albertans somewhat or strongly agreed that quitting smoking is possible.[1]
- Many Albertans have quit smoking: there are now just as many former smokers (24%) as there are current smokers (23%) in Alberta.[2]
- The U.S. Public Health Service (PHS) developed a Clinical Practice Guideline in 2000 for public health professionals. The guide contains the best evidence-based information about treatment effectiveness in smoking cessation.

- Once smokers are screened, health professionals can use the 5 A's intervention strategy suggested in the PHS guideline:[3,4]

  1. **Ask** smokers about their smoking habit.
  2. **Advise** smokers to quit.
  3. **Assess** smokers' motivation and readiness to quit and motivate smokers to consider cessation if they are not ready to quit with specific behavioural skills and pharmacological aids to achieve their cessation goals.
  4. **Assist** smokers by telling them how to quit if they are ready.
  5. **Arrange** with smokers follow-up care to prevent relapse. If smokers do relapse, they can be cycled back into treatment, and a new treatment plan can be developed. Thus treatment does not end until the smoker can maintain a tobacco-free life.

Definitions

A current smoker is a person who currently smokes cigarettes daily or occasionally.

A daily smoker is a person who currently smokes cigarettes every day.

A non-daily (occasional) smoker is a person who currently smokes cigarettes, but not every day.

(Note: These definitions are taken from the Canadian Tobacco Use Monitoring Survey)

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CESSATION OF TOBACCO USE

Many people have been able to quit smoking. For example, in Alberta there are now just as many former smokers (24%) as there are current smokers (23%), indicating that tobacco cessation is possible.[1] According to the AADAC 2003 Public Opinion Survey, many Albertans perceived this to be the case as well. In fact, 89% of Albertans somewhat or strongly agreed that quitting smoking is possible.[2]

A large body of literature on smoking cessation has identified a broad spectrum of factors that predict cessation. Consistent predictors of successful smoking cessation include high levels of motivation, readiness to change, ability to change, and supportive social networks; and lower levels of nicotine dependence, stress, and psychiatric comorbidity.[3, 4]

Gender and Smoking

In the literature, stress is identified as a significant barrier in smoking cessation for women. Smoking behaviour has been identified as a mechanism for coping with stress. Initiation of smoking behaviour in adolescence to cope with stressful life events has been demonstrated, and retrospective accounts of life events reveal that smokers report more stressful life events than do non-smokers. Moreover, smoking cessation has been associated negatively with stress and stressful life events. In a 2003 population level analysis, researchers have found that stressful events such as bankruptcy, divorce and receiving welfare are related to heavier levels of smoking.[5]

Women have greater expectations that smoking will reduce negative affect and are more likely to report that they smoke in response to stress.[6] Women are more likely to relapse and less likely to quit smoking if they have experienced adverse financial events, and are less likely to quit smoking if they have experienced an adverse health event.[5, 7] This may, in part, explain why women have poorer smoking cessation outcomes than men do.[5]

Exploring this phenomenon may help us develop more effective treatment programs for women. For example, treatments for women might be more effective if they provide techniques for coping with stressful life events and are heavily focused on preventing smoking relapse in the face of such events. Similarly, healthcare providers might be prompted to ask female former smokers about recent stressful episodes to provide appropriate aid and promote abstinence.[5]

Cessation Methods

Guidelines for Health Professionals

In 2000, the Public Health Service (PHS) of the U.S. Department of Health and Human Services published *Treating Tobacco Use and Dependence: A Clinical Practice Guideline*. The guideline was developed for primary care physicians, and stressed the importance of determining the tobacco use status of every patient and of offering at least minimal intervention to every user.[8]

The PHS Clinical Practice Guideline contains the best evidence-based information about treatment effectiveness. The overall PHS model for treatment of tobacco addiction includes reaching smokers within a larger population unit through various channels or delivery systems within the community, and screening for smokers and taking every opportunity to encourage them to consider cessation.[9, 10]

Once smokers are identified, health professionals can use the **5 A's** intervention strategy suggested in the PHS guideline:[9, 10]

1. **Ask** smokers about their smoking habit.
2. **Advise** smokers to quit.
3. **Assess** smokers' motivation and readiness to quit and motivate smokers to consider cessation if they are not ready to quit with specific behavioural skills and pharmacological aids to achieve their cessation goals.
4. **Assist** smokers by telling them how to quit if they are ready.
5. **Arrange** with smokers follow-up care to prevent relapse. If smokers do relapse, they can be cycled back into treatment, and a new treatment plan can be developed. Thus treatment does not end until the smoker can maintain a tobacco-free life.

While the guideline documents the various drug therapies available, it also emphasizes the importance of social support and skills training in cessation efforts.[8]

Major Findings and Recommendations of the PHS Smoking Cessation Clinical Practice Guideline[9, 10]

1. Tobacco dependence is a chronic condition that often requires repeated intervention. However, effective treatments exist that can produce long-term or even permanent abstinence.

2. Because effective tobacco dependence treatments are available, every patient who uses tobacco should be offered at least one of these treatments.

   - Patients willing to try to quit tobacco use should be provided with effective treatments such as the use of the 5 A's approach.
   - Patients unwilling to try to quit tobacco use should receive a brief intervention designed to increase their motivation to quit.

3. It is essential that clinicians and health care delivery systems consistently identify, document, and treat every tobacco user seen in a healthcare setting.

4. Brief tobacco dependence treatment is effective, and every patient who uses tobacco should be offered at least brief treatment.

5. There is a strong dose-response relationship between the intensity of tobacco dependence counselling and its effectiveness. Treatments involving person-to-person contact (via individual, group, or pro-active telephone counselling) are consistently effective, and their effectiveness increases with treatment intensity (that is, the number of minutes of contact).

6. Three types of counselling and behavioural therapies were found to be especially effective and should be used with all patients attempting tobacco cessation:

   - Provision of practical counselling (problem-solving and skills training).
   - Provision of social support as part of treatment (intra-treatment social support).
   - Help in securing social support outside of treatment (extra-treatment social support).

7. Numerous effective pharmacotherapies for smoking cessation now exist. Except in the presence of contraindications, these should be used with all patients attempting to quit smoking.

   - Five first-line pharmacotherapies have been identified that reliably increase long-term smoking abstinence rates:
     - bupropion SR
     - nicotine gum
     - nicotine inhaler

- nicotine nasal spray
- nicotine patch

- Two second-line pharmacotherapies have been identified as effective and may be considered by clinicians if first-line pharmacotherapies are not effective:
  - clonidine
  - nortriptyline
- Over-the-counter nicotine patches are effective relative to placebo, and their use should be encouraged.

8. Tobacco dependence treatments are both clinically effective and cost-effective relative to other medical and disease prevention interventions.

Approaches to Smoking Cessation

A wide range of cessation methods are available in Alberta to help smokers cope with the physical and psychological symptoms of withdrawal, and to support the process of long-term change.

Smoking cessation methods include self-help programs or products, counselling and formal support programs, drug therapies, and a variety of other, non-drug therapies. Often several methods or techniques are used together to increase the smoker's chances of success.

Self-Help

Studies show that over 90% of smokers use self-help methods to quit rather than an organized program.[11]

"Self-quitters" quit without the support of an organized program, although many use self-help aids that are designed to be used without additional assistance. Information and interactive tools are available to self-quitters via the Internet. Self-help products such as video or audiotapes, pamphlets or booklets, and computer programs are widely available.

Most smokers try to quit "cold turkey," without any cessation aids. This method results in fairly low success rates (about 5%).

Smokers who relapse after having quit for a week or more should be strongly encouraged to avoid returning to high levels of cigarette consumption. By reducing their addiction level, they will better their chances of cessation the next time around.

Counselling and Support Groups

Counselling and support have been proven to increase quitting success rates.

New counselling techniques such as telephone counselling have expanded the availability of social and behavioural support for smokers making a quit attempt and have also doubled or tripled success rates.[12]

1. Group programs and peer support

Many health agencies offer support and education through group programs at minimal or no cost to the smoker. Information and support is also available through various Web sites and chat groups on the Internet. Studies have shown that long-term maintenance sessions can improve success rates.[11]

2. Individual counselling

One-on-one counselling and specialty clinics offer intensive counselling and individual strategies.

3. Counselling by a healthcare professional

Studies have shown that cessation advice given by physicians, nurses, pharmacists, dentists, dental hygienists and therapists can help motivate smokers to quit and have a positive effect on cessation rates.[14] A review of studies found that a brief prompt with limited counselling can yield a quit rate of 3% to 13%, while a more intensive intervention that includes follow-up sessions can produce cessation rates between 13 and 40%.[11]

Many cessation programs are based on behaviour modification methods such as relaxation, developing coping skills, identifying and avoiding smoking triggers, nicotine fading (gradually reducing nicotine intake), and relapse prevention training. Well-designed behaviour modification programs have been shown to double cessation rates.[15]

Drug Therapies

Drug therapies seem particularly promising, especially when used in conjunction with support programs and/or counselling.

Drug therapies used to reduce cravings and increase quit success include nicotine replacement therapies (nicotine gum, patch, nasal spray and inhaler) and bupropion. Use of these drug therapies can double or triple quit rates.[11]

1. Nicotine replacement therapies

(Nicotine gum such as Nicorette®, Nicorette Plus®, and nicotine patches such as Nicotrol®, Nicoderm Patch® and Habitrol®)

Two forms of nicotine replacement therapies (NRTs) are licensed as over-the-counter medication in Canada: nicotine chewing gum and the nicotine patch. (Two other forms of nicotine replacement therapy, a nasal spray and an inhalator, are now available by prescription in the United States and may be available in Canada in the next few years.) Both the gum and the patch temporarily provide smokers with a lower, more gradual dose of nicotine to help reduce the severity of withdrawal symptoms: with both products, smokers get one third to one half of their normal nicotine intake.[16] NRTs are designed to break the smoking

cycle, cut exposure to carcinogens and other chemicals in cigarettes, and ease withdrawal. They are used until initial withdrawal symptoms have lessened and until smokers feel more confident in their ability to quit — usually less than three months.[16]

NRTs have been proven to double the chances of long-term cessation, and success increases when used in combination with well-developed support or behaviour modification programs.[13]

There are two main drawbacks to using these products. First, some smokers will continue to experience withdrawal symptoms because NRTs offer slower and lower doses of nicotine than do cigarettes (cigarettes offer high levels of nicotine seven seconds after inhaling).[16] Second, about 10% of gum users become dependent on the gum.[17]

Since nicotine replacement therapies (NRTs) such as the patch and gum became available in Canada without a prescription, they have become an important part of self-help strategies.

What are the differences between the gum and the patch?

These are the primary differences between nicotine chewing gum and the nicotine patch:[17]

- the speed at which they deliver nicotine to the brain: the gum delivers a faster boost of nicotine, 20 to 30 minutes after each dose; the patch offers a steady release over a longer period (it's worn 16 to 24 hours a day).
- the ease of use: the gum requires more instruction and is more complicated to use than the patch.
- the degree to which smokers can regulate the dose themselves: the gum can be regulated by the smoker, while the patch offers a consistent dose.

Side effects: the gum can cause mouth and stomach irritation; the patch can cause skin irritation, insomnia and nightmares.

2. Nicotine-free pill (Zyban® or bupropion hydrochloride)

Zyban® is a prescription drug that helps to suppress withdrawal symptoms and reduce the weight gain associated with smoking cessation.[18] Studies show that Zyban doubles the rate of cessation, and combining Zyban with a nicotine replacement therapy may produce even better results.[18]

Zyban comes in the form of time-released tablets. Treatment begins one week before the quit date and continues for seven to 12 weeks. Side effects include dry mouth, headache, insomnia and, in rare cases, seizures.[19]

Zyban is a weak inhibitor of the neuronal uptake of norepinephrine and dopamine (chemicals in the brain), which are affected by nicotine.[20]

The nicotine-free pill called Zyban must not be confused with the ZYBAN sold in nurseries, which is a fungicide powder used on grass and ornamental plants — this powder is harmful to humans.

Alternative Non-drug Therapies

Alternative, non-drug therapies are popular, although few have been scientifically proven to increase cessation rates. These are some examples of non-drug therapies:

1. Hypnosis

Hypnotic therapy seeks to alter smokers' attitudes toward tobacco by offering them suggestions or prompts while they are in a relaxed and focused (hypnotic) state. Hypnosis can be used either in a group or an individual setting. The success rate of hypnosis is unclear: evaluations have produced contradictory results, with cessation rates ranging from 0% to 80%.[18] Hypnosis may be more successful when used with other cessation methods.[19]

2. Acupuncture

Acupuncture is based on the Chinese science of energy pathways in the body. Needles or staple-like attachments are inserted in the skin at strategic points with the theory that this will reduce or eliminate cravings to smoke.

Recent studies suggest that acupuncture is somewhat more effective than the 5% self-quitter rate. However, acupuncture has been shown to be no more effective than placebo acupuncture in helping smokers quit.[21, 22]

3. Laser therapy

Laser therapy is based on the same principle as acupuncture, but it uses lasers rather than needles to relieve withdrawal symptoms. This method is new to Canada and there is no scientific evidence to support the high success rates attributed to it.[21, 22] In fact, a recent study found no significant difference in cessation rates between a laser treatment group and control groups.[23]

4. Substitution

Some smokers try to substitute herbal or clove cigarettes for their regular brands, believing them to be a healthy alternative. Neither is safe, however. Herbal cigarettes pose a health risk because they generate carbon monoxide and tar, and because smoke from any plant product can damage the lungs and airways.

The Stages of Change Model

Another approach that has been used by smokers and health professionals to better understand the process of quitting is the stages of change model. This model was developed 20 years ago, but has become widely used in cessation programs in the past few years. Today, many programs use a "staged" approach to intervention.[24, 25] The model recognizes that quitting does not happen in one step and that change is a dynamic process.

Understanding the stages of change model can help programmers refine their interventions and target smokers at various stages. Below is a description of the five stages involved in changing addictive behaviour and examples of appropriate intervention goals for each stage of change.[24-27]

1. Precontemplation

In this first stage, the smoker has no intention of quitting in the next six months. Twenty-two per cent of Canadian smokers and 24% of Albertan smokers are in this stage, according to the 2001 Canadian Tobacco Use Monitoring Survey.[26]

Examples of appropriate intervention goals[27]

- Increase the client's perception of the risks associated with smoking.
- Encourage the client to begin considering the pros and cons of smoking.

2. Contemplation

A smoker in the contemplation stage is aware that a problem exists and is seriously thinking about quitting at some point, but has not yet made a plan to do so. People can remain stuck in this stage for a long time. Eighteen per cent of Canadian smokers and 20% of Albertan smokers are in this stage.[26]

Examples of appropriate intervention goals[27]

- Tip the decisional balance in favour of quitting.
- Increase motivation to quit.

3. Preparation

In this stage, the smoker has made a decision to quit within the next 30 days and prepares to do so. Usually this involves mental preparation, but some smokers also try to ready themselves for abstinence by cutting down or by delaying the first cigarette of the day. Eight per cent of Canadian and Albertan smokers are in this stage.[26]

Examples of appropriate intervention goals[27]

- Help the client select the best approaches to cessation.
- Help build the client's confidence in his or her ability to achieve abstinence.

4. Action

The action stage begins with the first day of abstinence and continues for six months. Two per cent of Canadian smokers and 4% Albertan smokers are in this stage.[26]

Examples of appropriate intervention goals[27]

- Help the client develop a plan of action (based on level of addiction and experience with previous cessation attempts).
- Support the client in learning cessation techniques and skills.

5. Maintenance

In maintenance, people actively work to prevent relapse and remain non-smokers. Maintenance is a continuation, not an absence, of change. A large proportion of Canadian smokers and Albertan smokers are in this stage: 50% and 44%, respectively.[26]

The relevance of the stages of change model to adolescent smoking cessation is currently being studied. Early findings suggest that the model is generally appropriate to youth but likely requires some refinements because adolescents seem to enter the action stage prematurely. When young people do not complete the earlier stages, they are poorly prepared for cessation. Research suggests, therefore, that a heavy emphasis should be placed on the early stages of change (precontemplation and preparation) in youth cessation efforts.[27]

Almost 70% of Canadian smokers and about 60% of Albertan smokers are in the pre-action stages of change.[26] Yet most of the available cessation programs are designed for smokers in the action stage.[1]

Examples of appropriate intervention goals[27]

- Help the client identify and use relapse prevention strategies (substitute behaviours, coping strategies).
- Offer support.

Research indicates that many Albertan and Canadian smokers would like to quit: they are in the precontemplation, contemplation and preparation stages of change.[26] Many have already quit. As understanding of tobacco addiction and behaviour change continues to grow, the support for people wanting to quit will continue to evolve so that smokers have a better chance of overcoming their addiction.

Spit Tobacco Cessation Methods

Dentists and dental hygienists are trained to detect oral lesions and periodontal problems that are related to tobacco use. As such, dentists and dental hygienists are in a position to help prevent the initiation of tobacco use by children and adolescents through the use of positive anti-tobacco messages. Over the past decade, tobacco cessation strategies have been modified for practical use in the dental setting.[28]

Over the past two decades, assessments of tobacco counselling by dentists have concluded that they were not adequately communicating to their patients the importance of quitting. However, there is good evidence to suggest that healthcare professionals can increase rates of cessation. In fact, dentists who implement an effective smoking cessation program can expect to achieve quit rates up to 10 to 15% each year among their patients who smoke or use spit tobacco.[29]

A study reviewed several brief spit tobacco cessation treatment interventions by dental professionals: oral cancer screening, cessation advice, self-help materials, and brief cessation counselling by a dental hygienist. This study found that oral screening and brief cessation counselling by dental professionals in the dental office or in athletic facilities were effective in promoting spit tobacco cessation.[30]

A systematic review of the literature found that behavioural interventions for spit tobacco users are effective for increasing spit tobacco abstinence rates. The review also found that Bupropion SR is probably effective and nicotine replacement therapy may be effective.[31]

Research in the area of spit tobacco cessation is limited, but seems to suggest that a combination of therapies offers the greatest hope for success. Often a drug therapy (either nicotine replacement therapy or Zyban) is used in combination with some form of behaviour modification counselling or support.[32] Drug therapy helps to ease withdrawal symptoms (which are similar to those of smokers), and counselling helps to identify triggers and develop effective coping strategies.

Users are taught to substitute safe oral substances such as non-nicotine mint or herbal snuff, pumpkin or sunflower seeds, or chewing gum.[33]

Summary

Many Albertans have quit smoking: there are now just as many former smokers (24%) as there are current smokers (23%) in Alberta, indicating that tobacco cessation is possible.[1] According to the AADAC 2003 Public Opinion Survey, many Albertans (89%) somewhat or strongly agreed that quitting smoking is possible.[2]

A wide range of cessation methods are available in Alberta to help smokers cope with the physical and psychological symptoms of withdrawal, and to support the process of long-term change.

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TOBACCO-ATTRIBUTABLE MORTALITY

Quick Facts

- An estimated three million people die from tobacco-related diseases worldwide each year.[1]
- Researchers estimate that the global death rate will rise to 10 million per year within 30 to 40 years.[2]
- Tobacco causes one in four deaths in developed countries, one in eight deaths in developing countries, and one in six deaths worldwide.[3]
- Smoking is the leading cause of preventable illness, disability and death in Canada.[4]
- An estimated 47,581 Canadians died in 1998 from tobacco-related diseases, an increase of 24% (9,224 deaths) since 1989.[5]
- It was estimated that approximately 3,400 Albertans die each year from tobacco-related diseases.[6]
- Smoking kills more people in this country than AIDS, motor vehicle collisions, murder, suicide and illicit drug use combined.[4]
- Half of all regular smokers will eventually be killed by their habit, and most of these deaths are premature.[2]
- In 2003, lung cancer continues to be the leading cause of cancer death amongst Canadian men and women.[7,8,9]

- Researchers estimate that, on average, smokers lose about 15 years of their lives.[10]
- Potential years of life lost (PYLL) in Canada because of smoking are estimated at 500,000 each year, with 35,000 of these in Alberta.[11]
- Between 1988 and 1997, fires caused by smokers' materials led to 870 deaths in Canada and 88 deaths in Alberta.[12]
- From 1997 to 2001, there were 2,310 fires caused by smokers' materials in Alberta, resulting in 284 injuries, 40 deaths and an estimated $46 million in property damage.[13]
- Smokers can reduce their risk of premature death by quitting.[14, 15, 16, 17]
- On average, people who quit smoking before the age of 50 cut their risk of premature death by half.[14]

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TOBACCO-ATTRIBUTABLE MORTALITY

One of the statistics most often used to convey the urgency of tobacco reduction is the estimated number of tobacco-related deaths. The millions of lives that tobacco claims each year make tobacco an important public health issue.

Mortality Worldwide

Worldwide, an estimated three million people die from tobacco-related diseases each year.[1] Tobacco causes[2]

- one in four deaths in developed countries
- one in eight deaths in developing countries
- one in six deaths worldwide

About 500 million people alive today will eventually die from tobacco consumption if current smoking patterns continue.[3]

Researchers estimate that, within 30 years, the number of global tobacco-related deaths will rise to 10 million per year, and tobacco will become the single biggest cause of death worldwide.[3]

Incidence and Mortality in Canada and Alberta

In Canada, an estimated 47,581 people died from tobacco-related diseases in 1998, and an estimated 7,593 of them were from the prairie provinces.[5] A 1995 Canadian study projected 3,400 tobacco-attributable deaths in Alberta between 1991 and 2000.[6]

According to the 2003 Canadian Cancer Statistics, an estimated 139,900 new cases of cancer and 67,400 deaths from cancer will occur in Canada in 2003.[7] Smoking is the leading cause of preventable illness, disability and death in Canada. At least 21% of all deaths among Canadians over 35 are tobacco-related.[8] In fact, smoking kills more people than HIV/AIDS, motor vehicle collisions, murder, suicide and illicit drug use combined.[8]

One fifth of all deaths from the three leading causes of mortality in Canada — cancer, heart disease and stroke — are attributed to cigarette smoking.[9] Smoking causes about 17,700 cancer deaths in Canada each year, and about 2,500 of those occur in the prairie provinces.[10] Lung cancer is by far the leading cause of premature death due to cancer.[7]

Mortality rates in Canada continue to rise.

Mortality rates in Canada continue to rise even though smoking rates have generally been on the decline. This is because there is a latency period of about 20 to 30 years from the time of regular smoking exposure to the onset of disease. Mortality rates today reflect the smoking behaviour of the 1970s and 1980s.[11] Between 1989 and 1998,

the number of tobacco-related deaths in Canada increased by an estimated 24% (9,224 deaths), rising faster among women than men. Tobacco-related deaths among women rose from 10,820 dealths in 1989 to 16,999 in 1998, an increase of 57% (6,179 deaths). Among men, the number of deaths remained relatively constant throughout this period — from 27,537 in 1989 to 29,836 in 1998.[3]

Half of all regular (lifelong) cigarette smokers will eventually die from their habit,[12] and most of these deaths are premature.[4]

PYLL stands for "potential years of life lost" and is a calculation of the number of years of life lost when someone dies prematurely. PYLL is calculated using mortality estimates and represents the difference between life expectancy and age of death for persons of the same age and gender.

Potential years of life lost (PYLL) in Canada because of smoking are estimated at 500,000 each year, with 35,000 of these in Alberta.[13] Among men, smoking is responsible for almost one third of PYLL because of cancer, almost one quarter of PYLL because of diseases of the heart, and about one half of PYLL because of respiratory disease. Among women, smoking is responsible for about one fifth of PYLL because of cancer.[7]

Researchers estimate that, on average, smokers lose about 15 years of their lives. Those who die before age 70 (about half) lose an average of 22 years; those who die after age 70 lose an average of eight years.[14] Even at age 35, a smoker's life expectancy is reduced by 10 to 20%.[15]

Lung Cancer Rates by Gender

During the lifetime of Canadian men and women, it is expected that:[7]

- 1 in 18 women will develop lung cancer
- 1 in 20 women will die from lung cancer, making it the most likely cause of cancer death in Canadian women
- 1 in 11 men will develop lung cancer
- 1 in 12 men will die from lung cancer, making it the leading cause of cancer deaths amongst Canadian men.

Lung cancer is the number one cause of cancer deaths among men and women in Alberta[7] and Canada,[7] and worldwide.[7, 16, 17] And smoking causes most of these deaths. Researchers estimate that 80% to 90% of all lung cancer is tobacco-related.[12]

Lung cancer incidence and mortality rates among women

The National Cancer Institute of Canada estimated 9,000 new cases of all cancers for women in Canada, in 2003. This makes lung cancer the second leading form of cancer in women. *Of these 9,000 new Canadian lung cancer cases, 780 were estimated for Alberta females in 2003.*[7] Lung cancer alone caused an estimated 25% of all cancer deaths in Canadian and Alberta women in 2003. In Alberta, this amounts to about 630 deaths.[7]

In 2003, lung cancer continued to be the leading cause of cancer death in Canadian women. Lung cancer deaths among Canadian women accounted for an estimated 7,900 deaths, compared with the 5,300 deaths expected from breast cancer.[7] This reflects a rapid increase in the mortality in lung cancer rates for women over the past three decades, while breast cancer mortality rates have declined slightly.[7]

Lung cancer incidence and mortality rates among Canadian women, in 2003, continued to increase and is now three to four times as high as rates in 1974. However, estimated rates for lung cancer incidence and mortality among women in 2003 are still much lower than those among men.[7] (Refer to figure 1)

Lung cancer incidence and mortality rates among men

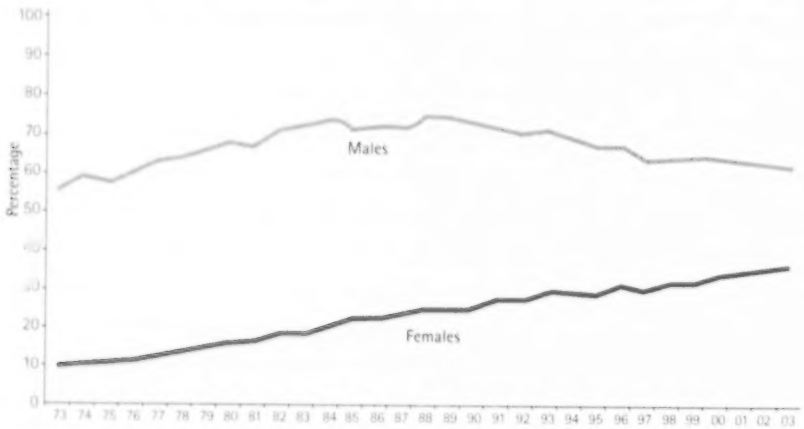
Among men, lung cancer mortality rates leveled off in the mid-1980s and have since consistently declined, reflecting a drop in tobacco consumption by Canadian men beginning in the mid-1960s.[7, 12] (Refer to Figure 1)

Lung cancer incidence is the second leading cause of cancer amongst Canadian men in 2003 at an estimated 12,200 new cases, following prostate cancer with an incidence of 18,800 new cases. Of the 12,220 new lung cancer cases, 880 cases were estimated to occur in Alberta males in 2003.[7]

In 2003, lung cancer remained the leading cause of cancer death in Canadian men, estimated at 30% (10,900 cases) of all cancer deaths. *Lung cancer alone caused an estimated 750 deaths in Alberta men in 2003 (about 28% of all cancer deaths).*[7]

The survival rate for lung cancer is extremely low. The National Cancer Institute of Canada estimates that the death to cases ratio for lung cancer is 0.89, which means that about 89% of all lung cancer cases are fatal within five years of diagnosis.[7]

Figure 1. Age-Standardized Mortality Rates for Lung Cancer, by Sex, Canada, 1973-2003



Source: National Cancer Institute of Canada. Canadian Cancer Statistics 2003. Canada; 2003.

Mortality from Heart Disease

In Canada, lung cancer, ischemic heart disease, chronic obstructive lung disease, and stroke account for two thirds or more of the smoking-attributable deaths in women.[15]

Coronary heart disease (CHD) is the leading cause of mortality among middle-aged and older women, and 41% of deaths from CHD in women under the age of 65 are attributable to cigarette smoking.[16]

Mortality from Fire

In Canada, smokers' materials are the leading cause of fire deaths. One in five fire deaths in Canada and one in four fire deaths in Alberta are due to fires ignited by smokers' materials. Smokers' materials are sources of ignition, such as cigarettes, pipes, cigars, matches and lighters, which are used in conjunction with smoking.[23]

Between 1988 and 1997, 652,882 fires were reported in Canada, of which 36,125 were fires related to smokers' materials. In total, there were 870 deaths and 4,202 injuries resulting in approximately $433 million in property damage.[23]

Over this 10-year period (1988 to 1997), there were 70,600 reported fires in Alberta of which 4,841 were related to smoker's materials. These fires killed 88 people, injured 626 others, and resulted in property damages amounting to $56 million.[23]

Data available from 1997 to 2001 report a total of 2,310 fires in Alberta with 284 injuries and 40 deaths resulting from these fires caused by smokers' materials. A total of approximately $46 million in property damage was assessed over this five-year period.[24]

Estimating Tobacco-Attributable Mortality (TAM)

How is TAM calculated?

Because estimates for smoking-attributable mortality are so often used in tobacco control, it's useful to understand how those numbers are calculated. Estimates are developed using the Tobacco-Attributable Mortality, Morbidity and Economic Cost method (TAMMEC),[25] and are based upon the following data:

- annual Canadian mortality data for 26 disease categories known to be attributable to smoking
- smoking prevalence rates for the same year (in adults aged 35 and older*)

*for the purposes of estimating total tobacco-related deaths, it's assumed that no death is caused by smoking in people under the age of 35. In fact, tobacco-related deaths can occur before age 35, but those numbers are small and do not affect overall percentages.

Perceptions of Health Consequences

Although the statistics available indicate a significant risk associated with health consequences from smoking, a study looking at women smokers' perceptions of smoking-related health risks found that the majority of women smokers surveyed perceived their lifetime risk for developing heart disease and lung cancer as average or below average. It appears that women smokers are more aware of their increased risk of developing lung cancer than their increased risk for developing heart disease.[17] As a whole, women who smoke have unrealistic beliefs about their immunity to both diseases, but are even less likely to acknowledge their increased risk of heart disease than they are to acknowledge the risk for lung cancer.

These findings are consistent with other studies that have shown that although smokers perceive increased risk compared with never smokers and former smokers, they underestimate their personal risk of suffering the health-related consequences of smoking.[18]

The risk of tobacco-related premature death is dependent on a number of factors including number of years as a smoker, number of cigarettes per day, and presence or absence of disease upon quitting. The estimates quoted here vary accordingly, but smoking cessation has proven benefits for all smokers, even older smokers and smokers who have a tobacco-related disease.[19]

- relative risk ratios (based on the Cancer Prevention Study II of the American Cancer Society)

What are the latest numbers available?

Most of the estimates available today are based on 1996 data. The estimated number of tobacco-related deaths in 1996 was 45,215.[3] Here's how that number is broken down:

Tobacco-Attributable Mortality, Canada 1998[3]

Adult diseases (35+ years of age)	
Cancers: lip, oral cavity, pharynx, esophagus, pancreas, larynx, trachea, lung, bronchus, cervix uteri, urinary bladder, other urinary	18,347
Cardiovascular: rheumatic heart disease, hypertension, ischemic heart disease, pulmonary heart disease, other heart disease, cerebrovascular disease, atherosclerosis, aortic aneurysm, other arterial disease	17,413
Respiratory Diseases: respiratory tuberculosis, pneumonia/influenza, bronchitis/emphysema, asthma, chronic airways obstruction	10,618
Pediatric Diseases (less than one year of age)	
Low birth weight, respiratory distress syndrome, respiratory conditions (newborn), sudden infant death syndrome	96
Passive Smoking Deaths	
Deaths among non-smokers from lung cancer and heart disease attributable to passive smoking	1,107

Quitting and Related Mortality

Good news: smokers can reduce the risk of premature death by quitting.

On average, people who quit smoking before the age of 50 cut their risk of premature death by half.[25] Compared to continuing smokers, people who have quit smoking have a reduced risk of heart disease, lung cancer, chronic lung disease and other tobacco-related illnesses.

Even one day after quitting smoking the heart, blood pressure, and the blood show improvements. One year after quitting, the excess risk of dying from coronary heart disease is cut by half. And the risk continues to drop after one year, returning to normal after about 15 years. The risk of stroke also returns to the level of a non-smoker's within five to 15 years of cessation.[25] After 15 years, the risk of coronary heart disease is similar to that of a never-smoker, and the overall risk of death almost the same, especially if the smoker quits before illness develops.[4,25]

A recent study that reviewed the literature to determine the magnitude of risk reduction achieved by smoking cessation in patients with coronary heart disease found a 36% reduction in risk of dying from coronary heart disease for those who quit smoking compared to those

who continued smoking. Thus, quitting smoking is associated with a substantial reduction in the risk of death among those with coronary heart disease, regardless of age and sex.[27]

People who have already been diagnosed with coronary heart disease can reduce their risk of another heart attack by 50% or more by quitting smoking.

The risk of lung cancer drops steadily for people who quit smoking; after 10 years, it is cut by about half (30 to 50%).[25] Smoking cessation reduces the risk of other tobacco-related cancers as well, including cancer of the larynx (voice box), oral cavity (mouth and throat), esophagus, pancreas and urinary bladder.[25]

Quitting also significantly reduces the risk of respiratory diseases (chronic obstructive pulmonary disease, influenza, pneumonia and bronchitis) and improves lung function.[28]

Smoking cessation has major and immediate health benefits for all smokers, young and old, sick and well.[28-30] It is the single most important step that smokers can take to enhance the length and quality of their lives.

Summary

Globally, tobacco-related mortality is expected to rise from three million annually to 10 million annually by 2030, with 70% of these deaths occurring in developing countries.[1]

Tobacco-attributable mortality can be linked to mortality from cancer, respiratory diseases, cardiovascular diseases, pediatric diseases, passive smoking (environmental tobacco smoke) and fires.

Lung cancer is the number one cause of cancer deaths among men and women in Alberta,[7] in Canada,[7] and worldwide.[7, 10, 17]

According to the National Cancer Institute of Canada, approximately 30% of cancer deaths in Canadian men and 25% in Canadian women are due to lung cancer alone.[7]

And smoking causes most of these deaths: researchers estimate that 80% to 90% of all lung cancer is tobacco-related.[12]

In Alberta, lung cancer is estimated to account for 27.8% of all cancer deaths in men and 25.2% of all cancer deaths in women, in 2003.[7]

While the lung cancer mortality rates amongst Canadian men began to decline in the 1990s, the mortality rates are on the increase for Canadian women.

Although the greatest benefit from smoking cessation occurs when young, even quitting in middle age avoids much of the excess health risk associated with smoking.[25, 28, 30]

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General Tobacco Facts

Alberta Tobacco Reduction Strategy (ATRS): Truth About Tobacco

Alberta Alcohol and Drug Abuse Commission (AADAC) – Tobacco

http://tobacco.aadac.com/

AADAC'S Truth About Tobacco Web site provides information on tobacco, smoking, youth prevention and how to quit. The website also offers information about the Alberta Tobacco Reduction Strategy, programs, resources, media campaigns and interactive games.

International Organizations

World Health Organization (WHO): Tobacco Free Initiative (TFI)

http://www.who.int/tobacco/en/

The Tobacco Free Initiative (TFI) is a WHO cabinet project created to focus international attention, resources and action on the global tobacco pandemic that kills 4.9 million people a year today. Every tobacco death is preventable. That is TFI's message and challenge.

United States

Centers for Disease Control (CDC) – Health topic: Tobacco

http://www.cdc.gov/health/tobacco.htm

The Centers for Disease Control and Prevention (CDC) is an internationally recognized organization providing credible, evidence-based information on a variety of health topics, including tobacco issues. From this Web site one can access scientific publications such as the U.S. Surgeon General's Reports and the Morbidity and Mortality Weekly Reports, tobacco control program guidelines and best practices, education materials, and resources to help one quit smoking.

National Cancer Institute (NCI) – Tobacco/Smoking publication list

https://cissecure.nci.nih.gov/ncipubs/

This Web site provides valuable cancer-related health information and information about the work being conducted by NCI-supported scientists throughout the country. For the general public and health professionals, NCI offers consumer-oriented information on a wide range of topics as well as comprehensive descriptions of NCI research programs. Scientists will find detailed information on specific areas of research and funding opportunities.

Canada

Health Canada — Tobacco Control Programme

http://www.hc-sc.gc.ca/hecs-sesc/tobacco/index.html
or http://www.gosmokefree.ca

Health Canada — The Facts About Tobacco includes tips to keep children tobacco-free and information on

- health effects of tobacco
- what makes tobacco addictive
- what influences children to smoke
- pre- and post-natal issues related to tobacco exposure
- the benefits of quitting
- second-hand and environmental tobacco smoke

Canadian Council for Tobacco Control (CTCC)

http://www.cctc.ca/

The CCTC is committed to ensuring the timely and practical transfer of critical knowledge and skill development for effective local, provincial, and national action on tobacco issues. CCTC acts as a key facilitating agent to coordinate and support advocates in tobacco control. It does this by

- creating and maintaining a knowledge network
- actively linking key persons and agencies throughout the tobacco control movement so that they may benefit from each other's knowledge and experience.

Physicians for a Smoke-Free Canada

http://www.smoke-free.ca/

Physicians for a Smoke-Free Canada (PSC) is a national health organization of Canadian physicians who share one goal: the reduction of tobacco-caused illness through reduced smoking and reduced exposure to second-hand smoke.

Other Canadian Provinces

British Columbia Ministry of Health Services Tobacco Strategy

http://www.healthplanning.gov.bc.ca/tobacco/index.html

This Web site provides information on the tobacco reduction strategy in British Columbia and the resources used.

Government of the Northwest Territories Health and Social Services

http://www.hlthss.gov.nt.ca/Features/Initiatives/initiatives.htm

Building on national and territorial strategies prepared over the past four years, Action on Tobacco: A Territorial Strategy for Tobacco Control identifies the goals, actions and measures to prevent or reduce the use of tobacco in the NWT.

Manitoba Department of Health

http://www.gov.mb.ca/health/index.html

This site provides information on the Manitoba Tobacco Reduction Strategy and the activities and resources used in Manitoba.

Nova Scotia Department of Health Tobacco Control Unit

http://www.gov.ns.ca/health/tcu/default.htm

This Web site provides a wide range of information, from helpful tips on quitting tobacco use to statistics on smoking-related illness.

Saskatchewan Health

http://www.health.gov.sk.ca/ps_tobacco_reduction.html

This Web site provides information on the Tobacco Control Act and tobacco reduction publications.

Yukon Department of Health and Social Services

http://www.hss.gov.yk.ca/prog/hp/tobacco/index.html

This Web site has information on the Yukon Tobacco Reduction Strategy, tobacco facts and information for smokers who want to quit.

Specific Topic Areas

Cessation

Health Canada

http://www.hc-sc.gc.ca/hecs-sesc/tobacco/quitting/index.html

Offering a variety of great resources on quitting, this site includes solid information on different nicotine replacement therapies and other alternative options to assist in cessation as well as program tips and information targeting specific audiences.

E-Quit – Online Cessation Program

http://www.infotobacco.com

This site offers an on-line quitting program based on e-mail.

Quitnet – A Free Resource to Quit Smoking

http://www.quitnet.com/qn_main.html

This site is based on the principle of "smokers helping smokers to quit." It offers a variety of useful ways to support smokers and provides general and personalized resources for quitting.

Stop Smoking Center

http://www.stopsmokingcenter.org

This Web site and support community can help those who have recently quit, or those who are thinking about quitting smoking. People can talk to experienced quitters in an expert moderated Support Group, find a Quitting Buddy, or create their own free customized quit program that will track their progress and give them the help when they need it most. There is no cost to participate in this program.

Saskatchewan Lung Association

http://www.sk.lung.ca/smoking/

The Saskatchewan Lung Association Web site is a free on-line smoking cessation resource for people who are and are not ready to quit, and provides advice for family and friends of smokers.

Quit&Win2004

http://www.quitandwin.org

This is an international smoking cessation Web site supported by international partners such as the World Health Organization. Smokers from all over the world can sign up for the smoking cessation contest for adults and win prizes for abstaining from the use of tobacco products for four weeks.

American Lung Association's Freedom from Smoking Program

http://www.lungusa.org/ffs/index.html

This Web site is an on-line version of the Lung Association's Freedom from Smoking group support program.

Canadian Lung Association

http://www.lung.ca/smoking/smoking_cessation.pdf

This Web site has a downloadable workbook entitled "Do You Want to Quit?" to assist smokers in quitting.

National Spit Tobacco Educational Program (NSTEP)

http://www.nstep.org/resources/cessation/users.html

This Web site provides spit tobacco facts and resource materials on the prevention and cessation of spit tobacco use.

QuitTobacco.com

http://www.quittobacco.com/

The QuitTobacco.com Web site provides information on spit tobacco and smoking cessation programs and aids.

What You Need to Know About Smoking Cessation

http://quitsmoking.about.com/

This Web site offers help for kicking a smoking habit and staying nicotine-free.

Youth and Smoking

British Columbia Ministry of Health Planning: Tobacco Facts

http://www.tobaccofacts.org

This Web site provides tobacco prevention resources for kids, teachers and parents. There are also resources for smokers who want to quit.

Centers for Disease Control (CDC) – Tobacco Information and Prevention Source (TIPS): Tips for Youth

http://www.cdc.gov/tobacco/tips4youth.htm

This Web site has a lot of good tips, information and fact sheets about staying tobacco free.

Centers for Disease Control (CDC) – Tobacco Information and Prevention Source (TIPS): I Quit

http://www.cdc.gov/tobacco/educational_materials/iquit.htm

This CDC Web site provides "I Quit," a how-to-quit resource for youth.

Quit4Life (Q4L)

http://www.hc-sc.gc.ca/hecs-sesc/tobacco/youth/quit/quit.html

This Health Canada Web site provides information and resources to help youth quit smoking. Quit for Life (Q4L) is designed to help daily and occasional smokers aged 12 to 18 to quit smoking. This program builds on confidence and motivation to quit, provides youth with information about the roadblocks to quitting and how to deal with stress, as well as provides a process for quitting using a four-step plan.

Calgary Health Region: Tobacco Reduction Youth

http://www.crha-health.ab.ca/pophlth/tobacco/youth.htm

This Calgary Health Region Web site for youth provides many resources and links to assist youth in learning more about tobacco use and its effects.

NoTobacco.org

http://www.notobacco.org/

This Web site contains multimedia information and links to resources about tobacco use and quitting.

A Breathe of Fresh Air

http://www.4woman.gov/QuitSmoking/teens.cfm

The National Women's Health Information Center is a U.S. Web site. It provides information for young women who are trying to quit, addressing issues of why it is important to quit and how to quit. This site has information for teens and parents.

National Center for Tobacco Free Kids

http://www.tobaccofreekids.org/

This U.S. Web site exposes the tactics used by industry to hook youth into tobacco consumption. The site includes resources such as a tobacco ad gallery, fact sheets and latest news.

Media Awareness Network

http://www.media-awareness.ca/english/index.cfm

This Web site promotes media literacy about tobacco, targeting youth in grades 6 to 9.

Canadian Lung Association

http://www.lung.ca

This Web site provides Canadian statistics on smoking use and its consequences, a "Quit Smoking Guide," and a description of diseases related to smoking. This national Web site also links to the provincial lung associations.

Health Canada: You and Me Smoke Free

http://www.hc-sc.gc.ca/hecs-sesc/tobacco/youth/index.html

This is a Health Canada Web site for youth. The Web site includes information and tips for quitting, and raises awareness about the tobacco industry.

Spit Tobacco

National Spit Tobacco Education Program

http://www.nstep.org

The National Spit Tobacco Education Program is a U.S.-based program. This Web site provides prevention and cessation information for youth and adults on spit tobacco issues.

Government of Saskatchewan

http://www.health.gov.sk.ca/rr_smokeless_tobacco.html

This Government of Saskatchewan Web site has facts about spit tobacco.

American Academy of Family Physicians

http://www.familydoctor.org/handouts/177.html

The familydoctor.org Web site contains a factual handout on how to quit using spit tobacco.

American Academy of Otolaryngology

http://www.sinuscarecenter.com/tobchaao.html

This brochure on "Spit Tobacco" from the American Academy of Otolaryngology highlights the dangers of using spit tobacco and provides cessation tips.

Pregnancy and Smoking

Pregnets Web site

http://pregnets.org/

The Pregnets Web site hosts the most up-to-date information on smoking cessation practices for pregnant and postpartum women. The Web site also has answers to common questions about pregnancy and smoking, second-hand smoke, and getting help and support for quitting smoking.

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